

# The Seybold Report on Professional Computing

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**L**AST WEEK at its annual stockholders meeting, Apple unveiled its long-awaited Lisa "personal office system." Everyone is now free to speculate about what this new desk-top computer will mean for Apple, for the office, and for the future of desk-top computers.

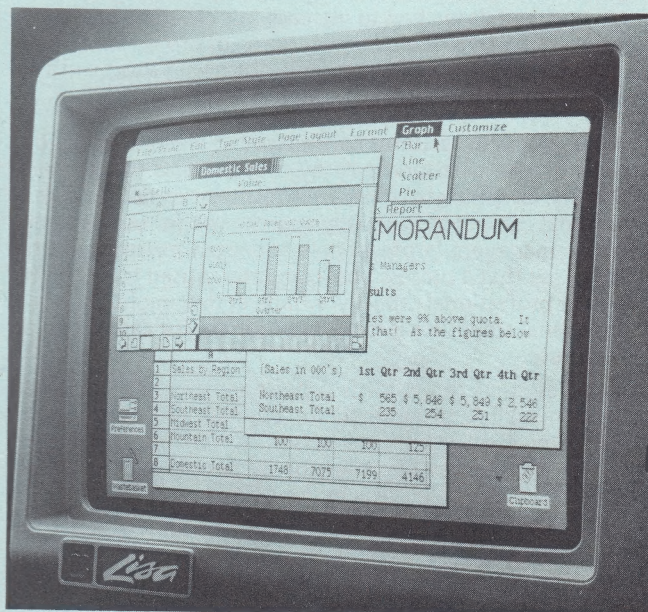
Even before it was announced, Lisa had proved to be one of the most controversial new computers in many years. Everyone seems to have an opinion—including a great many people who have not even seen the machine yet. On one hand Lisa has been hailed as a miracle machine which instantly obsoletes every other desk-top computer. More commonly it has been damned by critics who say that it will never work, that is over-priced, that Apple does not know how to sell to the office market for which this machine is so clearly intended, or simply that people do not need it and will not buy it.

The harsher critics have gone so far as to dismiss Apple as a "one product company" which has never known how to follow up its success with the Apple II.

We do not agree with either point of view. Lisa may not be a miracle, but it is certainly a milestone "event" of great importance. It may not instantly obsolete everything else on the market, but we believe that after Lisa the professional computing world will never be the same again.

**Why is Lisa important?** Why do we consider Lisa to be a milestone event?

1. It provides a common user environment for six key functions: text processing, spreadsheet calculation, business graphics, a drawing program, a personal data base program, and a PERT chart project scheduling capability. It gives the user the ability to copy files or portions of files between applications (so as to include business graphics in a written presentation, for example).
2. It provides what for most people is a new way of relating to a computer. After a user has become acclimated to the Lisa "culture" he will find it both seductive and easy to use. The combination of this superior "user interface" and the single environment for all application programs is likely to spoil people for anything less.
3. With the LisaProject PERT chart capabilities it introduces what could turn out to be one of the most important new personal computer tools since VisiCalc.
4. It has the potential of changing the way in which people communicate information. Lisa will encourage much more visual communication (business graphics, drawings, diagrams, PERT charts, etc.) rather than simply written communications.
5. It clearly moves Apple right into the office systems marketplace.



*Lisa. Apple's new desk-top system provides the user with a range of application packages that knit together to form an integrated work environment. Its extensive use of graphics helps the user learn these "new tools of the office" and subsequently to use them effectively.*

## APPLE'S LISA A Personal Office System

Other key features of Lisa include: inexpensive local area network capability, communication links to mainframe computers, inexpensive graphic output printers, and a very nicely executed modular construction which should make the machine easy to repair.

**The questions:** But Lisa costs \$10,000 (\$9,995 to be precise). What does it really offer to justify that price? Is it an expensive toy for "techies," or is it a productive office machine? No matter how good Lisa is, will business users be willing to pay a considerable premium for "professional computing" over the cost of personal computing? Will Lisa turn out like the Xerox Star to be a "jack of all trades" which does none really well? Does it achieve the slick user interface at the expense of performance? How quickly can one really learn to use it? And, do the things which make



## The Seybold Report on Professional Computing

This is the first of a new series of *Seybold Reports*, prepared by the staff of Seybold Publications. Its sister publications, *The Seybold Report on Office Systems* and *The Seybold Report on Publishing Systems*, are leading newsletters in the fields of office automation and editorial/publishing electronics. The penetration of personal and professional computers into the offices of every industry has progressed so far that we felt we had to increase our coverage to devote more attention to the new generation of professional-quality computers and software while not giving short shrift to our traditional areas of coverage.

**What is a professional computer?** It is *not* a device designed to be used primarily by professionals (researchers, doctors, lawyers, etc.). For, a professional computer, like a personal computer, is equally appropriate for use by secretaries, managers, professionals and even executives. One might say that a professional computer is used to assist you in your professional capacity, whatever that might be, while a personal computer is more appropriate for casual and at home use.

A professional computer is a personal computer that has "grown up." It is designed for business use by the non-computer literate business person. It may be used in the home for business purposes, or by people who work at home; but its real place is in the office.

If the professional computer is the appropriate desk-top machine for the office, how do we explain, then, the phenomenon of the *persona*: computer invasion in the office? Why are there such large numbers of Apples, TRS-80's, Commodore Pets, etc. in use in business today? Because professional quality computers and software are only now coming into being, and personal computers have been able to fill

the need for low-cost desk-top computers in the office in the absence of more appropriate solutions.

How do we characterize these more appropriate solutions? Here is the hard part. We could be oversimplistic and say that a professional computer must have a 16-bit processor, a hard disk (or at least the equivalent in terms of data storage—at least 5 MB), and a set of easy-to-learn integrated software programs (spreadsheet, data base, business graphics, word processing, project management, etc.) designed for the average office worker. We could also say that unlike an office system, the focus of the professional computer system is the individual's desk-top, not the entire office. Professional computing software does not necessarily need to concern itself with shared applications and functions, such as electronic mail, shared filing services, shared data base access, shared printer support, while a true office system has those responsibilities. And we could say that what distinguishes a professional from a *personal* computer is the quality of the software as well as that of the entire package (hardware, documentation, support). And, of course, we *could* say that what separates a professional computer from a "commercial-quality" word processor is the quality of the word processing software and the secretarial orientation of the WP device. But we won't say any of those things. Because, as you can tell, such distinctions are already becoming rather arbitrary.

So keep your eye on us, as we evolve with the industry. The editorial thrust of this new series on professional computing, of which six issues will appear irregularly throughout the coming year, will focus on systems and software that will be making a large impact on the way you do business in the years to come.

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life easy for the novice user slow down the more experienced operator?

To answer questions like these we embarked on an extensive test program with a "pre-announcement" Lisa. We have had a lot of fun, and we have learned a lot—which we would now like to share with you.

## System architecture

Lisa is clearly a system of the next generation. In fact, Apple vows that Lisa is the first of a family of products it will bring to the market over the next decade. This, more than anything else, helps explain the \$50 million investment and two hundred man-years (!) that have gone into its development. But what exactly is a Lisa?

First of all Lisa uses a *Motorola 68000 microprocessor*. A number of other new desk-top computers also use this 16-bit super microcomputer, but few start with nearly as much memory as Lisa. Because the sophistication of Lisa's operating system and office application software (all developed by Apple) result in programs that range from 200,000 to 400,000 characters in size, and because of the memory required to support its bit-map display, Lisa is configured with 1 million characters of RAM. This is generous by anyone's standards for a single-user computer! All this memory means faster performance because it reduces the need to swap software from disk, even when running multiple applications.

The *display*, your viewing portal into the world created by Lisa, is a high-resolution, black-and-white monitor with a





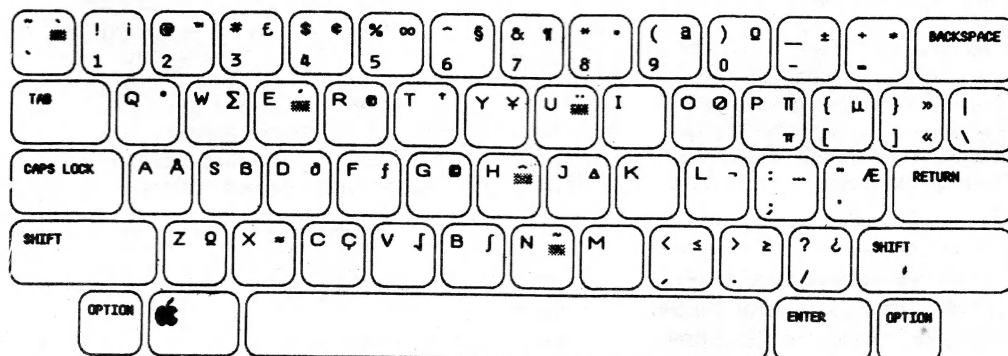
**The configuration.** Lisa is a desk-top computer of fairly compact dimensions. The Apple ProFile hard disk, here shown at the far right alongside the system, is often placed on top of the Lisa cabinet or on the floor under the desk to reduce space requirements. The dual floppy disk drives (code-named "twiggies") are easily visible beside the display.

Less obvious, but very important, is the ease with which Lisa can be serviced. Apple has paid careful attention to the physical packaging of Lisa. You can access any component without tools in no more than one to two minutes. New modules snap easily into place.

resolution of 720 pixels across by 364 down, each of which can be independently manipulated. With this 12" bit-mapped display, which is adequate for viewing one-half page of material in actual size, Lisa directly challenges the notion of using a large display as espoused by the Xerox Star, Apollo Domain, and Three Rivers PERQ. Lisa does not have a large screen for numerous reasons: for one thing Apple wanted to avoid the higher cost of a larger monitor and expensive supporting electronics. Above all, Lisa is designed to be a desk-top system, without a floor-standing cabinet to house electronics, disk drives and the like.

The keyboard contains 76 keys formed into two clusters. One cluster is the main keybank, which resembles a typewriter keyboard, but its 58 keys include some extras for symbols used more frequently in data processing or program development applications. On both sides of the space bar are some special keys, including the "Apple" key used in fast-path command execution.

The second cluster is a numeric keypad with the UP, DOWN, LEFT and RIGHT cursor keys superimposed on four



**Keyboard.** Lisa's keyboard is designed to permit typing of both the primary and alternate character sets. Either OPTION key is used to enter a character contained in the alternate set, and both shifted and unshifted symbols are shown in the right portion of a given key. The "APPLE" key is used by advanced users in conjunction with other keys to enter frequently-used commands (i.e., fastpath execution) directly from the keyboard rather than to select them from one of the command menus with the mouse.

non-numeric keys. These are *only* used to make spreadsheet applications (e.g., LisaCalc and LisaGraph) easier as you progress from one cell to another after entering each number.

If you want to increase your desk space when you are not using Lisa, the keyboard can be tucked away by sliding it into a cavity in the Lisa cabinet—a particularly nice feature in our opinion.

The mouse, however, is the main instrument for pointing at objects on the screen. Not surprisingly, Apple has chosen to design its own mouse rather than use one of the commercial alternatives appearing with increasing frequency (see *The Seybold Report on Office Systems, Vol. 6, No. 1, pp. 19-20*). The Lisa mouse is a mechanical device with a rotating ball on the underside for conveying motions of the hand on the desk surface. Unlike previous mouse designs, it has only one(!) button on top for indicating selections. People have complained that it is difficult to remember which button to press on a two or three button mouse. Apple decided that one button is sufficient.

**The mouse.** Apple designed its own mouse for pointing at objects on the screen. It is comfortable to use, is shaped and sized to minimize fatigue even with prolonged use, and rolls around the desktop without the "skating" problem that sometimes plagues mechanical mice (i.e., those with a rotating ball on the underside).



Contained within the Lisa cabinet, just to the right of the display monitor, are two 5¼" floppy diskette drives. They are double-density, double-sided units which store about 860,000(!) characters each. The diskette jacket is shaped with special cut-outs to ensure that it must be inserted into the disk drive correctly (one way of making it idiot-proof). The unique pattern of cut-outs, on the other hand, will cause alternate sources of compatible diskettes temporary headaches.

## Learning to Use Lisa

**LisaGuide.** In order to help someone learn Lisa for the very first time, Apple provides an on-line interactive instructional program called LisaGuide. The initial six LisaGuide lessons take approximately 30 minutes (about 5-6 minutes each), and there are four optional lessons which we recommend most people complete. LisaGuide accomplishes several objectives:

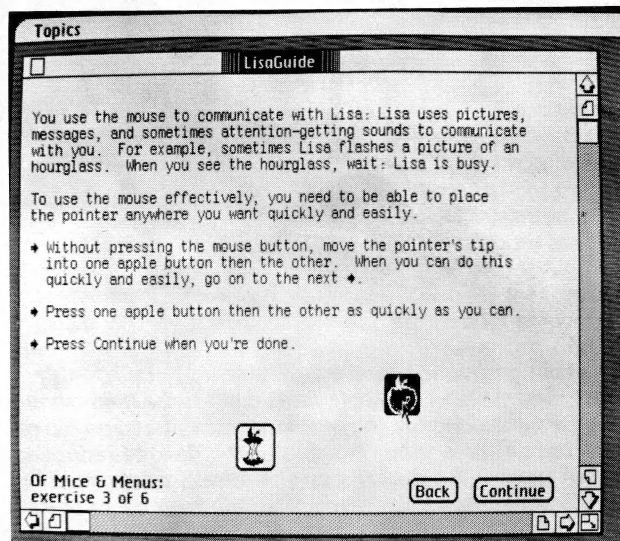
- It presents important ideas about Lisa and the way it works.
- It allows you to demonstrate your newly acquired knowledge by taking specific actions in response to situations posed by LisaGuide. When you take the proper steps, LisaGuide congratulates you with a message while it loads the next exercise. Some people, we might add, adore this interaction while others find it patronizing.
- It allows you to practice certain actions until you are confident that you understand the principles involved!
- It actually demonstrates the actions necessary to perform a given task if you need that extra level of assistance! At the same time, Apple has been careful not to provide too many of these in an effort to make sure that you don't sit back and just watch them instead of actually practicing actions yourself.
- It allows you to back up to review previous material, or proceed to the next exercise (or lesson) whenever you wish.

It is unusual to find a learning tool of this kind on a system intended for other than the educational market, and Apple is to be congratulated on approaching a very difficult technical problem with such vigor.

**Getting started.** Once you understand the basic principles of how to operate Lisa and use its desk-top environment, you are ready to learn how to use the individual office application tools. Sample documents on diskette are provided along with written instructional materials to teach you the basic principles of a given application in about 20-30 minutes. And because you use the materials in conjunction with your Lisa, you can progress at your own pace through whichever "Getting Started" lesson describes the particular application you need to learn.

**Tutorial materials.** The tutorial materials are very similar to the "Getting Started" materials except that they provide even deeper knowledge about a given subject.

**Reference guide materials.** For the expert user that needs to know precisely how a certain command or facility works, Apple has created detailed reference guide materials for each application tool. These are organized in a random access manner to facilitate getting a quick answer to a question without wading through extraneous information.



**LisaGuide exercise.** This exercise familiarizes you with using Lisa's mouse. The idea is to point at the two pictures of apples and click the button to demonstrate your positioning prowess. Each apple is "eaten" (converted into an apple core) after you select it. Also worth noting are the special BACK and CONTINUE buttons at the bottom of the screen, which you select to retreat to the previous or advance to the next exercise in the lesson.

**Is Lisa difficult to learn?** With this impressive array of instructional and reference materials, one might conclude that Lisa is so difficult to operate that all this is necessary in order to use it. In fact, Lisa is quite easy to learn in spite of its remarkable breadth. You do have to learn a new "culture"—how to operate the mouse, how to execute commands, how you deal with icons, how you manipulate screen windows, how you open and close documents and folders, how you set things aside and pick them up later. It may seem like a lot at first to the uninitiated novice. But it soon becomes very natural. Moreover, once you have learned to think in Lisa terms, the skills you have learned apply to all of the various applications. And, experience with one application transfers remarkably well to other applications.

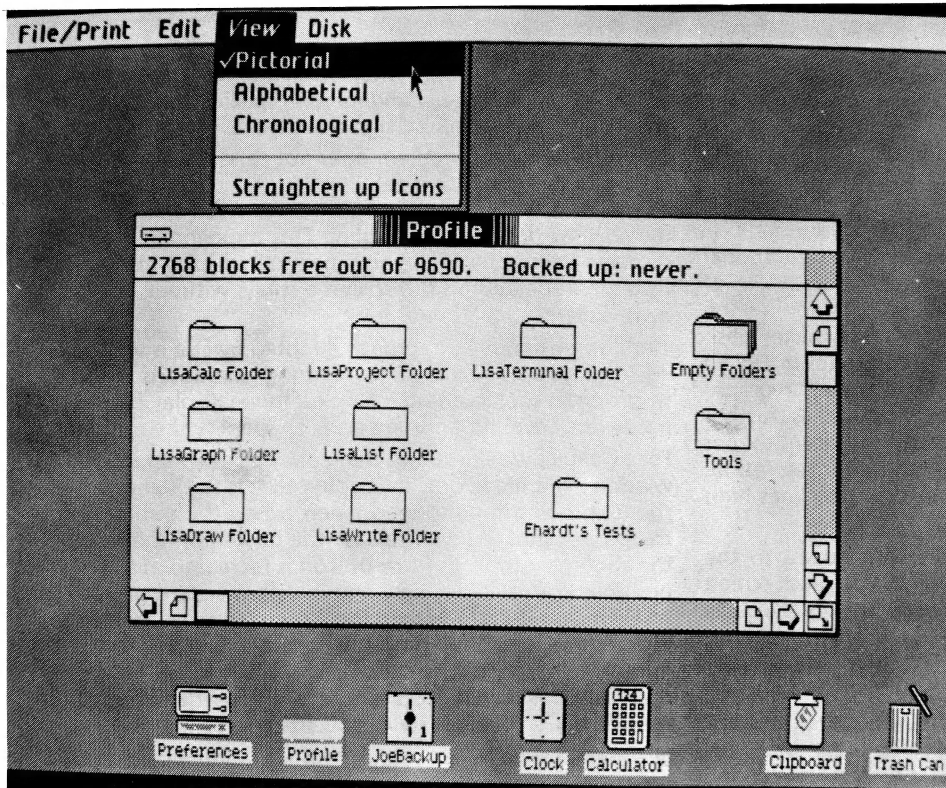
One of the real problems with personal computers has been that they have been too difficult for the average person to use. This has been compounded by an appalling level of training documentation and an equally poor level of knowledgeable customer support by dealers. Apple is trying to tackle all three problems with Lisa: a system which non-computer-types and poor typists can master relatively easily, truly comprehensive training and support materials, and an effort to sell only through selected dealers.

There is also a 5¼" non-removable Winchester disk drive with slightly less than 5 million characters of capacity, called "ProFile," which Apple originally developed for the Apple III. The Lisa software takes up something over 2 million characters of the available storage, leaving approximately 2¾ million characters for user files. The unit is relatively quiet and does not consume desk space as it typically sits on top of the Lisa cabinet, but we would prefer to exchange one of the integral floppy diskettes for a 10-million-character mini-

Winchester disk drive and eliminate the separate ProFile disk drive altogether.

Finally, Lisa provides two RS-232 serial interface ports for interfacing to communication modems or serial printers and one parallel port for connecting the hard disk. There are three expansion slots in the chassis for incorporating other circuit boards to interface to various kinds of peripherals, the dot-matrix printer or the Apple cluster network being examples.





**Left: The desktop.** Lisa employs a highly visual user interface to portray an "electronic" desk-top. The menu bar can be seen at the top. Note that the "view" command list has been pulled down and the "pictorial" command selected.

The large window in the middle of the screen shows icons representing the various file folders contained on the ProFile hard disk. (Alphabetical & chronological listings of files on the disk appear in the window looking like conventional directory listings.) Icons at the bottom of the screen represent various devices (Pro-File), desk-top tools (calculator) & resources (clipboard). All objects can be rearranged on the screen according to your own sense of space and placement.

**Below: Tailoring Lisa.** When you open the "preferences" icon (as opposed to the "profile" icon), you can personalize Lisa by setting various options. Shown here are the different convenience settings.

The black boxes indicate current choices. New choices are made by using the mouse to point at the desired box (see "check mark") and clicking the button to choose that setting.

## The desk-top

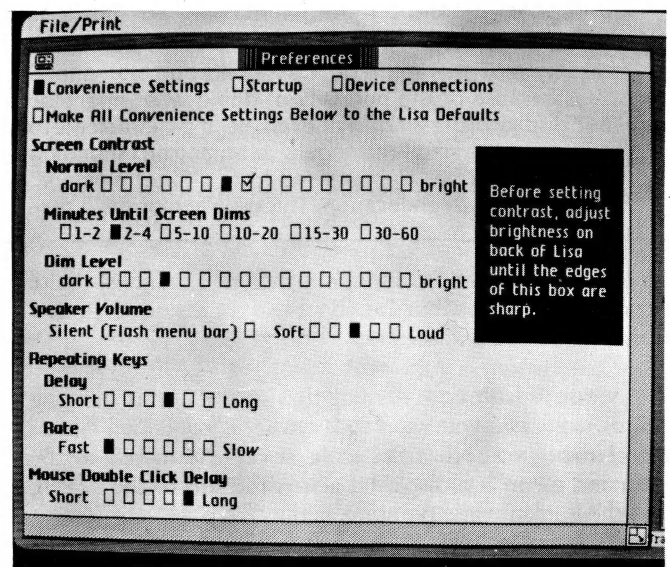
In an effort to make Lisa easy to learn and use, almost all of the screen is used to portray a "desk-top" environment on which are placed *icons* representing various familiar objects. Interestingly, the idea of the desk-top image, which underwent extensive development at the Xerox Palo Alto Research Center and now appears elsewhere, is creating considerable debate.<sup>1</sup>

Different icons are used to represent the Lisa computer, the hard disk, loaded floppy diskettes, the clock, the multi-function calculator, filing folders, a box of empty folders, individual documents or files, pads of paper of varying kinds, and programs. It is likely that only some of these icons might appear on the display at any given time, but that is purely the result of actions taken by the user. Since all instances of a particular type of icon look the same, a *name tag* is placed underneath each to differentiate one from another.

To *select* an object, you point at its icon with the mouse and click the button. Visually, the white icon is highlighted by inverting it to become a black one with white lettering. To select a group of objects at the same time, position the mouse at one corner of a flickering box, press and hold the button while you stretch the box to its diagonally opposite corner,

<sup>1</sup> Some people believe that the physical office environment is in need of significant change, so they argue that any system which mimicks its current form is in itself suspect. To a certain extent we agree.

Like these people, we recognize many of the failings of the existing office. But we also object to the arcane user interfaces typical of most computer systems. Keyboard-oriented and function-key-oriented systems solve none of these problems, whereas icon-oriented systems designed according to good human factors tend to improve the situation no matter what the eventual environment. There can be no doubt that Lisa is different from many systems, and we are convinced that it is better than many systems because it uses icons.



and then release the button. All objects located within this box are selected and highlighted.

To *rename* an object, select it and type a new name. To *move* an object or group of objects to another location, first select it with the mouse. Then, while pointing at the highlighted icon, press and hold the button while you slide the mouse (and icon) to its new location. Releasing the button places the object on the desk-top once more, where it will stay while you proceed with other activities. Or to *delete* an object, select it and move it to the wastebasket icon! As you



## Bit-Map Displays: The Pros and Cons

This will be the year of the bit-map display. A flood of entries featuring bit-map display technology will make the conventional "character-mapped" displays to which we all have become accustomed as the standard for computer display devices seem *passé*. The appeal of a bit-map display is immediately apparent: It can display a complex graphic image, limited only by the resolution of the raster-scan CRT presenting the display. This is in contrast to the traditional character display which can only display a repertoire of characters (usually burned into a PROM), positioning the characters into a fixed grids (often 80×24 character positions). These character displays are sometimes (as in TRS-80 and Apple II microcomputers) used for "character graphics," where each character position rectangle is further broken down into sub-character rectangles (often, six per character position) to provide somewhat better resolution. The rectangles thus created are still several scan lines high and several dot positions wide.

A bit-map display carries this sub-division process to the extreme: The computer can turn "on" or "off" each screen "pixel" or dot, and thus "high-resolution" graphics display becomes possible. Bit-map displays require at least one bit of RAM for every pixel on the screen (more for gray levels or color).

Of course, there are tradeoffs involved in adopting a bit-map display instead of a character-oriented one. Much attention has focused on the cost of the display memory, which has been a significant factor until recently. Now, though, the advent of the low-cost 64K-bit chip has permitted the use of bit-maps in even modestly-priced equipment, and attention has turned to another disadvantage of bit-map displays: the difficulty of maintaining fast response times.

Certain types of operations can be very slow on bit-mapped displays because of the necessity of doing what might be called "display processing." For example, if a character is to be displayed, the small rectangular bit-map corresponding to that character has to be moved from a "font memory" into the proper screen location. This usually requires a pro-

gram (albeit a very simple one) which does the data moving. (This process can be speeded up with special hardware, but then the cost is increased significantly.)

The corresponding problem does not exist in conventional character-oriented terminals, where the character-generator ROM handles the conversion from ASCII characters in memory to dots on the display. This happens during the display-refresh process, so any change in display memory is instantly reflected on the screen display, without any CPU involvement.

The display-handling approach adopted by Lisa is well-suited to give rapid response to common operations without resorting to sophisticated (and expensive) display-handling hardware. Several things are done to simplify the problem.

For example, when you use the mouse to move an icon or a window, you move only an outline that is the same size as the item being repositioned. Then, when the outline is in the proper spot and you release the button on the mouse, the contents of the window or icon is recreated in the new position. It is relatively easy and inexpensive to generate a freely-movable rectangle on the screen. To move freely the actual window, complete with contents, would require a more expensive solution. Lisa also avoids some potential response-time bottlenecks in the character-handling area by offering only a few styles and sizes.

But there are some unavoidable situations where Lisa's response times are limited by display-processing delays. These are most evident in LisaWrite. The display processing software cannot keep up with the burst typing rate of a good typist—which is why the screen display sometimes lags behind what has been typed. A worse condition arises when you want to scroll all of the text in a window horizontally or vertically. To accomplish this Lisa must recalculate the *entire* bit-mapped display for the text window. This is why scrolling is so slow. In general, with a display such as Lisa's it is better to move a screenful or so of data at a time rather than trying to scroll in small increments. LisaWrite supports such larger movements for vertical scrolling within a file, but not for horizontal scrolling.

can see, there is no need for commands to accomplish these particular operations, but Lisa does use commands for other operations as you will see later.

**The window frame.** Assuming that your screen is showing various icons and you want to see what is contained within one of them, you select the icon, sweep the mouse to the command menu bar displayed across the top of the screen, hold the button while pointing at the "file/print" tag (which drops a list of related commands on the screen), and then slide the mouse down the list until the "open ..." command is highlighted before releasing the button. What follows is the projection of the selected icon into a rectangular *window* displaying the object's contents. The more experienced user finds that pointing at this icon and clicking the button twice in rapid succession also opens it into a window.

The window has a precise organization which is fairly independent of whatever is being shown in it. The bar spanning the top of the window contains an icon of this object and its name tag. Down the right side and bottom edge of the window are the scrolling column and bar respectively.

The lower right-hand corner of the window contains a box with a "corner" icon. This can be tugged down and to the right to expand the size of the window to reveal more information. As a more general statement, you are completely free to adjust the window to any size the screen permits, whether to make the window tall and narrow, shallow and wide, or tall and wide.

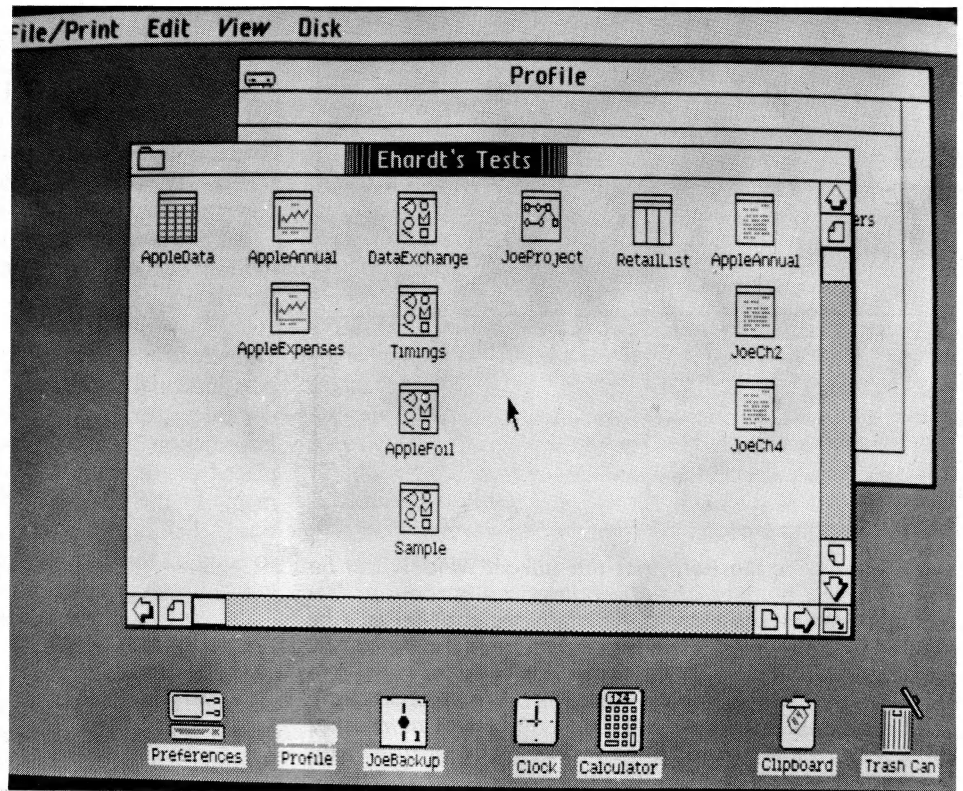
The entire window can be moved around as a unit by moving the mouse to the icon title bar at the top, pressing and holding the button while moving the window to the desired location, and then releasing the button to "drop" the window on the desk-top. If the window is displaying other icons (which would be the case if it were showing the contents of a file storage device or file folder), the revealed icons can themselves be selected and opened into still other windows.

**Commands.** Across the top of the screen is a command bar which shows the names of the different groups of commands which can be executed at any given moment. Only those command groups which are relevant to the current situation



**Overlapping windows.** Opening the file folder called "Ehardt's Tests" (which was shown in icon form in the ProFile window) reveals that it contains a number of documents. Furthermore, the graphic on each icon reveals the office application tool that created it (i.e., LisaCalc, LisaGraph, LisaDraw, LisaProject, LisaList and LisaWrite, from left to right). The fact that "Ehardt's Tests" is the active window is confirmed by the highlighted title bar and the visible horizontal and vertical scrolling bars along the right and bottom edges of the window. (Note how it differs from the inactive and mostly hidden window labeled "ProFile.")

The scrolling bars contain various graphic buttons for positioning information within the window, and the mouse is used to "click" one or another of them for the desired effect. The "arrow" buttons cause small changes of position (e.g., one line), while the nearby "view page" buttons cause the majority of the displayed information to be erased and new information shifted in (e.g., next screen with some carryover). The "elevator box" button at the top of the vertical shaft (and at the left of the horizontal shaft) causes "thumb indexed" jumps to positions within the viewed object. To perform this jump, simply slide the appropriate box vertically or horizontally within the respective shaft, and information located at that relative location will be displayed when you release the mouse button.



or current application are displayed. When the user places the mouse pointer on one of the command groups and presses the mouse button, he will "pull down" a list of available commands for that group. Still holding the button down, he may slide up and down the list of commands to select the one he wishes to execute. Commands which he may execute under the current situation are listed in black type. Commands which are incompatible with the current status are listed in gray. It is not possible to "select" a command in gray.

We soon learned to point to a command group, slide down the list of commands and release the mouse button on the command we wished to execute in one easy, quick motion.

**Overlapping windows.** With the revelation that Lisa permits multiple windows on the screen simultaneously, it is important to point out the way in which this is implemented. As a means for comparison, the Xerox Star professional

workstation never overlaps one document window with another (although an exception is made in the case of a property sheet window overlapping its parent window). But the considerably smaller screen of Lisa suggested to Apple that a different approach had to be found. As a consequence, the convention of overlapping windows is used throughout the design of Lisa, an idea we first saw implemented in the mid-'70s on the Xerox Smalltalk system running on Alto mini-computers.

With the potential for all these overlapping windows on the screen, Apple had to provide some means for the user to switch from one to the other. Moving the mouse to a window and clicking the button makes it the "active" window<sup>2</sup>.

Furthermore, when several windows overlap one another, only the contents of the active window appear unobstructed on the screen with absolute certainty. Just like numerous overlapping sheets of paper lying on the desk, those that are "on top" may obscure portions of the ones below. Selecting the bottom or middle of three overlapping windows causes the obstructed portion of the selected window to be "painted in" so that it can be seen as though it had been moved to the top of the stack.

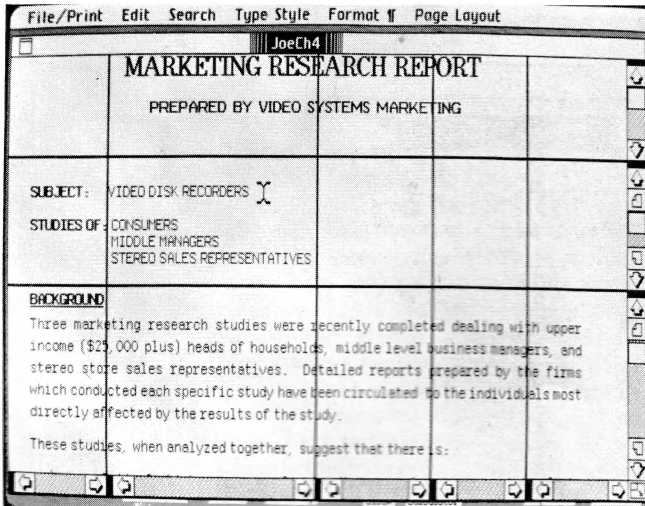
With LisaCalc, LisaGraph and LisaWrite, all of which will be individually discussed later in this article, each window can be further sub-divided to permit simultaneously different views of the same material.

### A Personal Insight

Our impression of Lisa went up one notch when we discovered that it remembers where things are when you finish with them, and it returns them to the same location when they are re-opened. Thus Lisa begins to fit like a glove as you work with it rather than continually plopping windows on the desk-top in an arbitrary manner causing you constantly to organize them. There's nothing more seductive than a system that begins to mirror your own actions.

<sup>2</sup> Visually, the "active" window is clearly identified on the screen because only its name tag (in the title bar) is highlighted and only its scrolling columns show the various symbols for vertical and horizontal scrolling and jumping through the visual space.





**Sub-windows.** To illustrate that the current window can be divided into a number of sub-windows, we introduced five vertical windows and three horizontal ones as delineated by the lines you see here. If we wanted to scroll the horizontal group of five windows in the lower row, we would use the scroll buttons to its immediate right. The other windows in the middle and upper rows would remain as they are. On the other hand, if we wanted to scroll the vertical group of three windows in the middle column, we would use the scroll buttons below it. This approach to scrolling is rare but very useful.

**The double helix.** Given the environment of the electronic desk-top, icons representing “tangible” objects and overlapping windows, how do you choose the appropriate office application tool to go with the document? The question, as it turns out, points out a major difference in the way Lisa works when compared to more “traditional” systems.

Those of you who are familiar with general-purpose computing systems which provide a variety of applications programs know that you first tell the operating system the name of the application you wish to run and then the name of the document it is to process. Thus you might say, run the electronic spreadsheet program, and then you tell this program, in a language that it alone understands, that you want a certain data file loaded.

Lisa shuns this traditional approach for a more unusual (and superior) approach—one that should increasingly gain favor during the next few years. *With Lisa, opening a particular icon into a window automatically loads the software tool especially designed to manipulate that object.*

- A folder automatically is processed by the Desk-top Manager.
- An electronic spreadsheet, portrayed as a sheet of paper with the horizontal and vertical rules of an accounting scratchpad, is automatically processed by LisaCalc.
- A business graphics document, portrayed as a sheet of paper with a lined graph, is automatically processed by Lisa-Graph.
- A drawing document, useful for making other forms of presentation materials and portrayed as a sheet with objects of various shapes, is automatically processed by LisaDraw.
- A scheduling document, portrayed as a sheet with interconnected tasks and milestones, is automatically processed by LisaProject.

- A personal data base document, portrayed as a sheet with ruled columns delineating fields of information, is automatically processed by LisaList.
- A written document, portrayed as a sheet with scribbled text, is automatically processed by LisaWrite.
- Pads<sup>3</sup> (or stacks) of folders and documents are automatically processed by the Desk-top Manager.

Thus our reference to the double helix or tight intertwining of the information with the application that manipulates it.

**The clipboard.** Yet another icon, the “clipboard,” is used to pass information from one location to another in the same document, or to pass information between documents. Any information which is “cut” or “copied” is automatically placed on the clipboard and is respectively removed or remains in the original document. The contents of the clipboard then can be pasted in identical form into another place so long as the receiving document (and its underlying program) is compatible.

Lest you go overboard and conclude that anything can be pasted anywhere, transferring information from one application to another sometimes can be only partially completed (e.g., pasting the values of a spreadsheet into a word processing document dispenses with any underlying formulæ) or sometimes it cannot be accomplished at all. This situation, though unfortunate, should improve as Lisa’s software becomes even more sophisticated than it is currently.

**Application programs.** Although there are some limitations, the real power of Lisa lies in the fact that it provides a relatively complete set of applications programs all of which operate within the same user environment and all of which combine remarkable power with seductive simplicity. We will look next at six key office application programs one at a time. Please bear in mind, however, that in the context of a multi-function system such as Lisa, we do not ask that each individual application package be the best of its kind, only that all be good enough to do the job intended, and that all operate in a completely consistent fashion.

<sup>3</sup> The user creates a new document by tearing off a sheet of paper from any pad of paper available for that application. A new folder can be created by picking up a new folder from a stack of blank folders. Or whenever you wish, you can ask that either a selected pad of paper or a stack of empty folders be duplicated. You can rename the selected item to suit your preference and move it to another spot according to your immediate needs or your permanent method of filing.

In the opposite vein, an individual object can be made into a pad whenever the occasion warrants. Thus an electronic spreadsheet (with cost categories labeled and formulæ embedded in the correct locations to automatically compute totals) can be converted into a common travel form to be repeatedly used with minimal effort.

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## Waiting for a Document

Although we found Lisa to be quite responsive for most activities, it takes a painfully long time to open a document and place it in a new window. To quantify just how long "painfully long" is, we took stopwatch timings of both the time it takes to load a document from a file folder stored on disk and the time it takes to re-open a file which has been temporarily "set aside" and left on the desk-top. The results of our tests are as follows:

	From Folder	From Desk-top
LisaCalc document	34-57 secs.	14-15 secs.
LisaGraph document	20-57 secs.	11-23 secs.
LisaDraw document	19-46 secs.	11-12 secs.
LisaProject document	30-50 secs.	12-18 secs.
LisaList document	18-20 secs.	13-19 secs.
LisaWrite document	35-47 secs.	14-15 secs.

As you can see, we show a range of times in each column. The *smaller time* is typical if you are loading a document of the same type as the last one loaded (e.g., a LisaCalc spreadsheet followed by another spreadsheet), while the *larger time* is typical if you are loading a document which is different in type from the last one.

What are the reasons for times such as these? The *first* is that the opening of a document (not a device directory or file folder) involves loading its application tool along with the document. Even a short document requires what might be a large software program. The *second* reason is that we were using an internal, development version of the system, which causes the application tools to be larger (hence take longer to load) than normal because of debugging code. The *third* reason is that the general process of getting programs optimized before shipment to customers is underway but unfinished.

We would therefore expect that later versions of the Lisa software will provide faster loading times than did the ones which we used. However, we would not expect the times to change dramatically. We doubt that opening a document on Lisa can ever be made to be a quick operation. We are afraid that Lisa users are ultimately just going to have to adjust to this.

## LisaCalc

This is Lisa's version of the ubiquitous electronic spreadsheet program, a tool which is changing the way so many of us work. The size of each spreadsheet may be as large as 255 rows of 255 columns of information, which is large enough to assuage all but the most insatiable users of spreadsheets. In most respects LisaCalc functionally resembles many of the spreadsheet programs (e.g., VisiCalc, SuperCalc and Multiplan) available for various brands of microcomputers.

**Creating a new spreadsheet.** Assume that you have conveniently placed pads of paper for each application on your desk-top (as we have). These pads are normally contained in appropriate folders stored on the hard disk. Two techniques may be used to create a new spreadsheet file:

- (1) Move the mouse to the *LisaCalc paper* icon, click the button to select it, move the mouse to *File/Print* within the menu bar at the top of the screen and select the *Tear Off Stationery* command in that list.
- (2) Move the mouse to the pad icon labeled *LisaCalc paper* and click the button twice in rapid succession.

Lisa now warns you to wait while it creates a new spreadsheet document, an operation that takes a little over ten seconds(!). The new document bears the name "Untitled," but you can change it to whatever you wish by typing a new name whenever its icon is selected. In all other respects, the new document is an exact clone or duplicate of its parent forms. Naturally, you can have many kinds of LisaCalc pads, with appropriate fields of information filled in beforehand, just as you have many pre-printed forms in your office.

**Working with an existing spreadsheet.** It makes no difference whether the spreadsheet you want to access is one that you have just created or one that has been used many times before. And because Lisa tries to make things simple to remember, the technique for opening a document is very similar to the one for creating a new document:

- (1) Move the mouse to the desired document icon, click the button to select it, move the mouse to *File/Print* within

## Road Signs

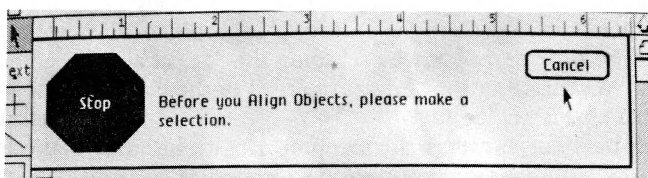
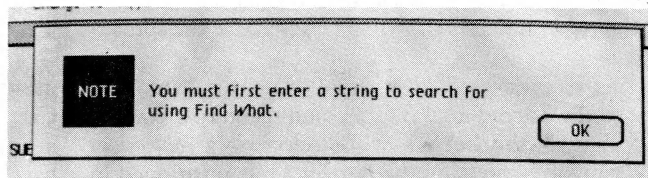
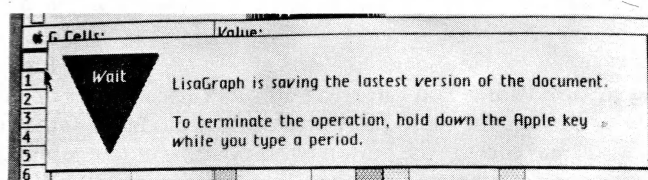
You can see that Lisa dramatically uses various symbols to make it clear what action (if any) is needed in a given situation.

The "Wait" sign appears whenever the operation may be lengthy, and it mentions how you can cancel the operation if you change your mind.

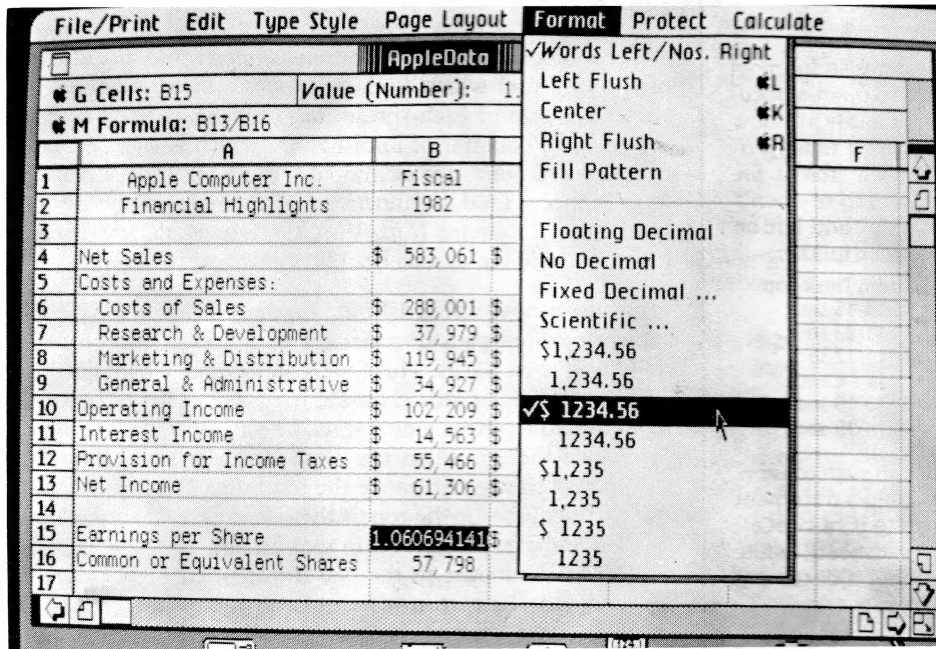
The "Note" sign often advises you that the action you requested is incomplete in some way.

The "Stop" sign is very dramatic.

There are other message forms we have not shown here.







### Spreadsheet organization

The row numbers and column letters of a spreadsheet are shown along the left edge and immediately above the data cells of the spreadsheet. The cell currently selected is highlighted with white characters on a black background. Three fields located at the top of the spreadsheet window display important information about this cell.

The field labeled "Cells," located in the upper left, displays the selected cell's row and column coordinates (B15). The "Value" field shows the cell's value calculated to extreme fractional significance, temporarily hidden by the "Format" command list. The "Formula" field on the second line displays the mathematical expression (B13/B16) used to compute the cell's value.

the menu bar at the top of the screen and select the *Open* command in that list.

- (2) Move the mouse to the *LisaCalc paper* icon and click the button twice in rapid succession.

The fact that the second technique is identical for both operations is not an accident. Lisa always tries to infer correctly what you wish done on the basis of the limited alternatives that are legitimate at any given moment. At the same time, Lisa always provides an absolutely clear way for you to specify what you wish done via the menu bar commands.

The selected icon expands into the actual spreadsheet—an operation which is quite dramatic visually. The window thus created shows a considerable amount of status information besides the actual tabular data. And because the spreadsheet is now the "active" window, the command bar at the top of the display screen is changed from Desk-top to LisaCalc commands.

**Selecting information.** You can select an *entire row* of information by moving the mouse to the left-most column of the spreadsheet and clicking the button while pointing at one of the boxes containing a row number. Similarly, an *entire column* can be selected by clicking the button while pointing at one of the column letters shown in boxes above the spreadsheet entries.

Selecting an *individual cell* is simply a matter of moving the mouse to the desired item (*i.e.*, a column and row coordinate) and clicking the button, while selecting a *contiguous group of cells* involves pressing the button while positioned in one corner and then sliding the mouse to the diagonally opposite corner before releasing the button. If appropriate, you can select the *entire spreadsheet* by selecting the "Select all of document" command in the "Edit" list. In all of these cases, the selected area is highlighted.

These methods, however, are inappropriate for inserting another row between two existing rows or another column between two columns on a spreadsheet. To insert a new row,

for example, move the mouse left of the spreadsheet body onto the list of row numbers, followed by a more accurate positioning of the mouse on the horizontal rule separating two rows. Now click the button, and the single rule is changed into a double rule, which tells you that you have indeed selected between two rows. If you see a highlighted row, you know that you have selected the row itself rather than space between rows. Inserting a new column involves comparable actions along the opposite or column-lettered axis of the spreadsheet. After the selection, you initiate the correct command, which we will now discuss.

**Operating on a selection.** After you have selected the item(s) you want, you must specify the desired action. Lisa always follows a "define/operate" convention: first you "define" or "select" an object, then perform some operation on that object. As with other Lisa application programs, the LisaCalc menu bar at the top of the screen shows the names of the various command groups which are appropriate for that particular application. For LisaCalc, these include: *file/print*, *edit*, *type style*, *page layout*, *format*, *protect*, and *calculate*. Within each group are individual commands for accomplishing various operations, some of which may be "de-activated" if they are incompatible with the item you have selected.

Let us say, however, that you wish to enter some fresh information. Just select the cell and type its contents. LisaCalc automatically formats numbers flush-right with a floating decimal point and text flush-left in the cell unless you have previously instructed LisaCalc to format information according to other rules. Naturally you can change the format of any or all information whenever you wish.

To alter an existing entry completely, select it and type the new data. Or if only a minor change is needed, select the cell and then click the button a second time after pointing at a precise position within the cell. The typing cursor will appear and you can insert and backspace characters as you need. Higher-level editing operations include:



Command	Meaning
Clear	Reset spreadsheet cell(s) to blank.
Cut	Delete selected information from the spreadsheet and place it on the Clipboard.
Copy	Copy selected information from the spreadsheet onto the Clipboard.
Paste	Copy all information from the Clipboard to the selected place in the spreadsheet. Embedded formulae are pasted <i>without</i> changing either the row or column references.
Paste adjusting	Copy all information from the Clipboard to the selected place in the spreadsheet and ask the user how to adjust the row or column references whenever they appear.
Paste values	Copy all data (e.g., ignore embedded formulae) from the clipboard to the spreadsheet.
Insert blank	Insert a blank row or column depending upon the orientation of the selection.

To prevent the accidental alteration of information, LisaCalc allows you to protect both formulae and data values or to protect only the formulae. Typically you would protect information integral to a standardized form, but you can subsequently unprotect anything (default) if it is imperative that it be modified.

We particularly like the feature of LisaCalc that encircles any cell where data is "missing" by virtue of being referenced in formulae stored in other cells. LisaCalc even provides a command to skip from one missing entry to the next so that you can easily enter this information.

And finally, those of you who are familiar with other spreadsheet programs know that all values are normally recalculated after each change, which can lead to considerable delay if you are working with a large spreadsheet. You can let Lisa recalculate after each change on small spreadsheets because it is so fast, but you also can instruct it not to recalculate unless you specifically request it—a very nice feature when you are dealing with spreadsheets.

**Formatting a spreadsheet.** There are also formatting functions which will operate on any "selected" information. For example, you can instruct LisaCalc to position information flush left, centered or flush right within the cell.

Furthermore, you can define the way in which information should be "masked:" with or without a decimal point, with a fixed decimal (e.g., 10.1) or a floating decimal with a variable number of fractional digits, in scientific notation, as well as conventional forms of numbers with or without dollar signs, commas and cents of dollars.

At a somewhat higher level, you can instruct LisaCalc to format a particular column according to a specified width, insert a page break between two rows or remove an existing page break. And finally, LisaCalc has implemented a small number of type faces for displaying information:

10-pitch Modern    12-pitch Modern    15-pitch Gothic  
10-pitch Courier    12 Pitch Prestige Elite

The ability actually to see these different type faces on the display in their actual size is a very unusual and noteworthy feature. If the entire screen width is used, spreadsheets up to 106 characters in width can be displayed without horizontal scrolling. Spreadsheets of about 150 characters in width can be printed by Lisa assuming 15-pitch Gothic in conjunction with landscape orientation of the page.

**How does it compare?** In the functional sense, LisaCalc is comparable to the VisiCalc and SuperCalc programs that are so prominent today. It does lack the "consolidation" feature (referencing data in other spreadsheet documents) found in Multiplan and recent enhancements of these other programs.

If, however, you use the "consolidate" function primarily because your current system cannot cope with very large spreadsheets (which is certainly not the only reason to use consolidate), you may not miss this function on Lisa. Its exceptionally large working memory gives it the ability to handle exceptionally large spreadsheets as a routine matter.

To check the amount of time required to recalculate numbers, we copied one spreadsheet we had entered until it

## Showing formulae

Asking LisaCalc to show both formulae and values of spreadsheet cells has resulted in the expansion of rows 10 and 15 to reveal the normally hidden formulae as well as the values derived from these formulae. The other rows in this spreadsheet contain no formulae whatsoever, so the values alone are shown.

File/Print Edit Type Style Page Layout Format Protect Calculate				
AppleData				
G Cells:		Value:		
M Formula:				
	A	B	C	
1	Apple Computer Inc.	Fiscal	Fiscal	Fi
2	Financial Highlights	1982	1981	1
3				
4	Net Sales	\$ 583,061	\$ 334,783	\$ 11
5	Costs and Expenses:			
6	Costs of Sales	\$ 288,001	\$ 170,124	\$ 6
7	Research & Development	\$ 37,979	\$ 20,956	\$
8	Marketing & Distribution	\$ 119,945	\$ 55,369	\$ 1
9	General & Administrative	\$ 34,927	\$ 22,191	\$
10	Operating Income	B4-(B6+B7+B8+B9)=	C4-(C6+C7+C8+C9)=	
11	Interest Income	\$ 14,563	\$ 10,400	\$ 567
12	Provision for Income Taxes	\$ 55,466	\$ 37,123	\$ 12,454
13	Net Income	\$ 61,306	\$ 39,420	\$ 11,698
14				
15		B13/B16=	C13/C16=	D13/D16=

☒ Calculate Automatically  
☐ Calculate Manually  
☐ Calculate Now  
☒ Show Formulas & Values  
☐ Show Values Only  
☒ Don't Circle Values  
☐ Circle Missing Values  
☐ Find Next Missing Values  
☐ Function Hints ...



formed a matrix of 150 rows of 20 columns each, and then clocked the recalculation time after we changed a number in one cell. It took less than 9 seconds. Naturally the number of formulae embedded in a spreadsheet is a critical factor affecting the time to recalculate, but 9 seconds strikes us as quite fast for scanning 3,000 cells.

And finally, we found the mouse made LisaCalc very easy to use, and yet spreadsheet cursor keys are provided for heavy entry of numbers into a small viewing area.

## LisaGraph

This program automatically produces popular styles of business graphics from data entered into a spreadsheet which resembles that of LisaCalc. After you enter LisaGraph, you see a multi-column spreadsheet on the left and its graphic representation on the right. The visual resemblance to LisaCalc, however, is slightly misleading. LisaGraph does allow text labels or simple numbers to be entered into its spreadsheet cells, but it prohibits the use of mathematical formulae in the generation of any numbers, which is an important departure from LisaCalc facilities.

**Entering information.** One way you can create a business graphic is by typing information via the keyboard. For a new document, you select the first row and column (e.g., A1) and type the information label and press the TAB or RETURN key<sup>4</sup> to proceed across or down the spreadsheet entering informa-

<sup>4</sup> As in LisaCalc, the spreadsheet cursor keys, which are located in the numeric keypad, also can be used for advancing the cursor to the next cell.

### From Digits to Art

Data can be portrayed in the form of pie charts, bar charts, line charts, and scattergrams designed to fit an entire page, one-half, one-third, or one-quarter of the page. The central chart is produced in a predictable series of steps, as the following description of the generation of a bar chart shows:

- Each entry in column A (e.g., A1, A2, ... Ax) becomes a separate label along the horizontal or X-axis.
- Each entry in column B becomes a separate vertical bar associated with each label. A positive number generates a bar above the X-axis, while a negative number produces a bar below the axis.
- Each entry in column C becomes a separate vertical bar abutting the previous bar above each label, and the same is true for any data in columns D, E, and so forth.
- The height of the vertical or Y-axis is automatically adjusted so that the tallest of the bars scales about three-quarters of the total height of the chart. Scaling numbers are automatically added to the Y-axis based upon the data values.
- Beginning with column B, a different pattern is used to fill each bar, and that same pattern is used to fill a related legend box located to the right of the chart.

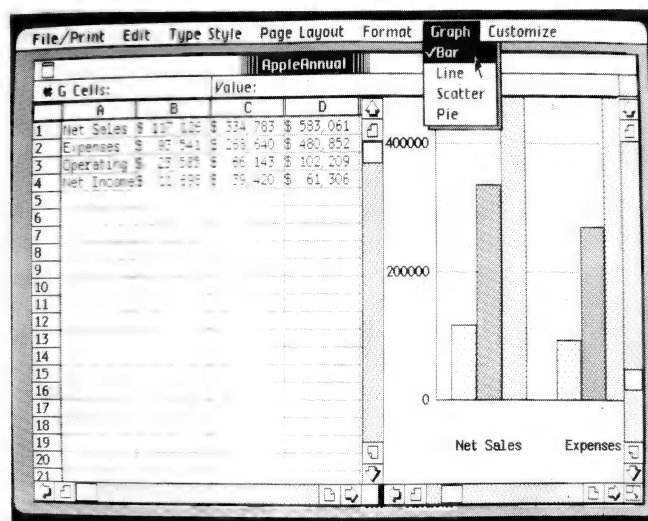
The process of generating line charts and scattergrams is very similar except for the different representation, and you can easily switch from one presentation form to the other using the same spreadsheet data. You simply select the appropriate form from the "Graph" list in the LisaGraph menu bar at the top of the screen.

Pie charts, on the other hand, are drawn using the data in column B and the labels in column A; other columns are intentionally ignored.

tion in other cells. While you are entering information, LisaGraph is generating the new graphic at every step with remarkable speed, thereby providing immediate feedback.

Alternatively, data (but not formulae) contained in a LisaCalc spreadsheet can be pasted into a LisaGraph spreadsheet. Because both application tools store data in cellular form, entire rows and columns, as well as individual and groups of cells, can be transferred from one to the other without difficulty.

Greater effort, however, is required to transfer information from a non-spreadsheet program such as LisaWrite into LisaGraph and LisaCalc. This is because LisaWrite stores information as flowing text rather than in cells, so the transfer is considered incompatible even when decimally-aligned columns of numbers are involved. Even though you cannot transfer information *en masse*, you can transfer each field individually. But this requires a level of patience which would tax the most meticulous of users.



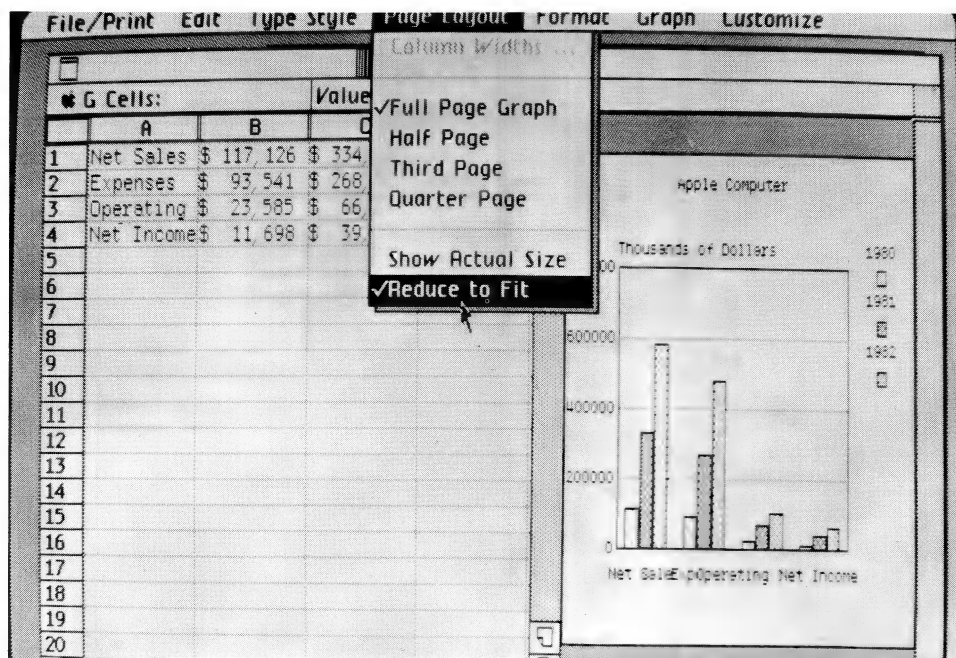
**Graph forms.** In the left sub-window are text labels and numbers used to produce the graph shown in the right sub-window. Each can be scrolled independently, and you can adjust their relative size by pointing at the thin, dark bar in the lower scrolling bar and sliding it horizontally to the desired position.

Since the bar chart form of presentation has been selected, the values in B1, C1, and D1 are converted into successive vertical bars of appropriate height and placed above the "Net Sales" label (A1), and so forth for all information in the table. Line and scatter charts use the same information but replace bars with the proper artwork. A pie chart, on the other hand, uses the information in columns A and B and ignores the rest.

**Double vision.** When we first started our discussion of LisaGraph we noted its use of *two sub-windows* within the standard viewing window. As you would expect, dividing the document window in this manner reduces the visual area available to see the numbers as well as the graph, but many other systems refuse to show you both at the same time, sometimes creating considerable delay as you switch back and forth between the two.

LisaGraph avoids this by allowing you to increase or decrease the width of the spreadsheet sub-window, which causes a corresponding decrease or increase in the width of the graphic sub-window. You also can use one of the smaller character sizes to see this data in a more compact form.





**Reduce to fit.** When you ask Lisa-Graph to generate a graphic larger than can be completely shown in the chart sub-window, the "Reduce to Fit" command displays a compressed version of the chart until you ask for it in actual size once again. This reduced version is very useful when you are entering and altering data and still wish to see the entire graphic simultaneously.

**The finishing touch.** With a few button clicks you can have LisaGraph add (or remove) grid lines so that it is easier to interpret the underlying values portrayed by scattergrams, line and bar charts. And by selecting the various locations where the graph title, subtitle, the legends for each column of data, X- and Y-axis titles, and the footnote phrases are found, you can type whatever text you wish to label the final chart.

To size this graph to fit different page layouts, you can set the basic dimensions of the graph as being either full page, half page, one-third or one-quarter page. The first three span the width of the whole page, while the latter occupies only half of that width and depth, making it suitable for fitting within a single column of double-column pages.

And finally, LisaGraph supports various type styles and sizes for labeling text, not to mention enhancing such text with attributes like underlining, emboldening, italicizing, and hollowed or shadowed letters. These facilities should be enough to satisfy most needs.

**Pros and cons.** What strikes us about LisaGraph is the facility with which it handles the preparation of business graphics. The fact that both data and graphic are visible at the same time is a definite advantage because you can enter or change the numbers and see immediate results. With most systems, you have to switch from one mode to another in the same program or, even worse, between programs.

LisaGraph does not support color graphics at this time, and we do not expect this to be resolved immediately. We suppose that sooner or later Apple may offer support for some sort of color output plotter. However, we suspect that for most business applications the nice monochrome graphics produced by Lisa (especially as embellished with LisaDraw) are really more valuable than color pen plotter or color dot matrix printer output. The Lisa monochrome graphics reproduce well for overhead projection and, unlike color graphics, can easily be reproduced for inclusion in hard-copy reports.

For true color presentation graphics, you probably require a color monitor and a much more expensive output printer or color camera.

People who deal almost exclusively with spreadsheet calculations and business graphics may miss the fact that Lisa-Graph is not completely integrated with LisaCalc in the same fashion as, say, the Context MBA and Lotus 1-2-3 application packages. However, Lisa provides a much more complete "environment" than do either of these programs, including access to LisaWrite and LisaDraw.

## LisaDraw

This program helps you create and alter illustrations for presentations or for inclusion in reports. It also is useful in taking a chart automatically produced by other Lisa application tools and embellishing it in various ways, or for simply presenting information in visual form. Once you get used to this way of thinking, it becomes a marvelous way to present not only organizational charts, office layouts and the like, but production flows, relationships of ideas to each other, and all kinds of things which might be cumbersome to convey simply with words.

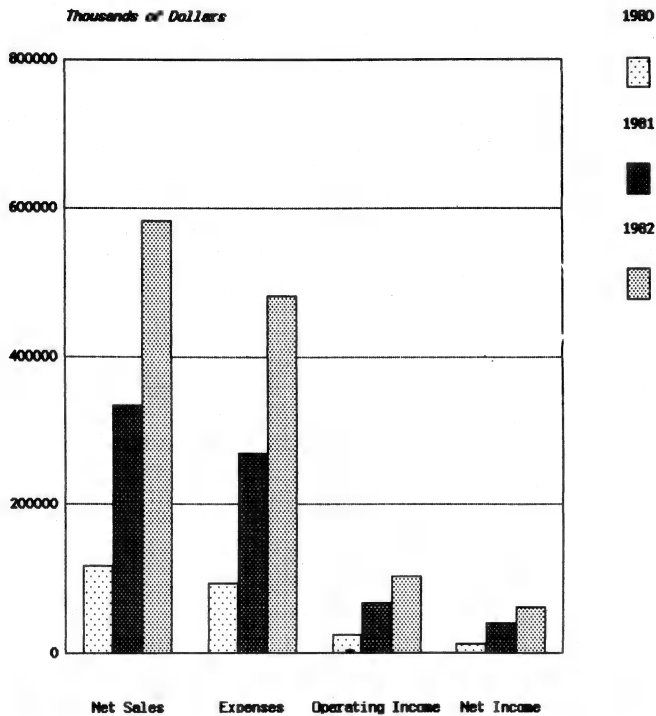
**Choosing the paper.** Everyone has a personalized way of starting work, but we prefer to choose the drawing paper immediately. By pointing with the mouse at the "page layout" tag in the menu bar and pressing the button down, you can see that plain or gridded paper is available. We invariably select gridded paper because it makes manual alignment of the various graphic objects considerably easier.

Independent of the kind of paper you are using, you can instruct LisaDraw to display rulers along the upper and left edges of the drawing area, with measurement marks denominated in inches or centimeters. In the same command list, you can select the size of the sheet of paper to be used for the drawing. The default size is one sheet measuring 8 inches by 10 inches, or 20 cm. by 25 cm. if metric dimensions are requested. The largest drawing area is 12 sheets across (96 inches or 240 cm.) by 5 sheets down (40 inches or 125 cm.).



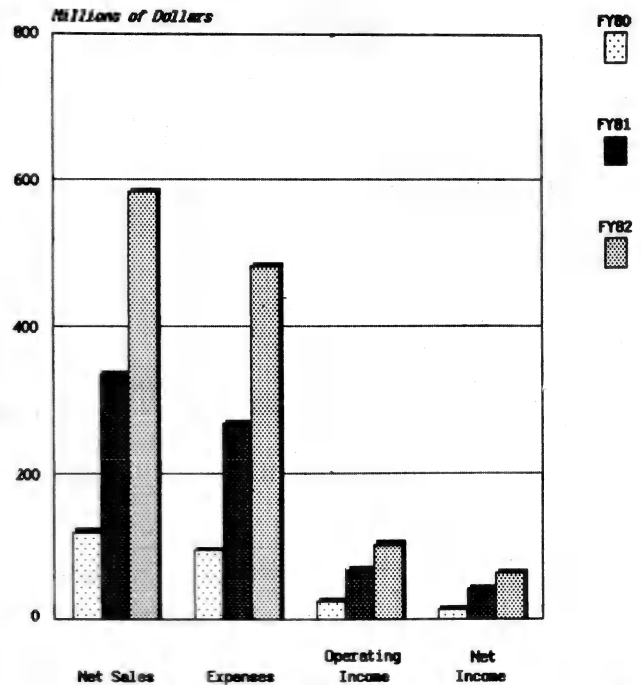
## Apple Computer

### Financial Information



## Apple Computer

### Financial Information



**Before and after.** The chart produced by LisaGraph (on the left) has been copied and pasted into a LisaDraw document (on the right) and embellished using LisaDraw's facilities. The time required to make these enhancements was less than five minutes.

**The drawing elements.** Having done all of the above, you are now free to explore LisaDraw's capabilities. Along the left edge of the window is a palette with ten boxes portraying the various drawing elements or shapes from which drawings may be made. You switch from one shape to another by selecting it with the mouse, causing the box to be highlighted with a gray background.

Let us explore the various shapes first. After you have selected the *box shape* in the palette, you should move the cursor onto the paper and align it at some point on the grid. Pressing the button fixes that corner of the box to the paper, permitting you to slide the mouse to the place where you want the diagonal corner before releasing the button. As you slide the mouse, LisaDraw interactively draws all horizontal and vertical sides of the box so that you see the rectangle as you stretch or shrink it.

If you select the *rounded-box shape* in the palette, precisely the same action is used, but the box will have rounded, rather than sharp, corners. And the *circle shape* in the palette is used to draw circular shapes in the same manner as boxes, which means that you can have a perfect circle, a wide and squat oval, a tall and slim oval, or whatever other variation you need.

Besides the three closed shapes, there are three controlled forms of lines. If you select the *intersecting crosshairs* in the palette, the mouse can be used to draw straight lines perfectly aligned in the horizontal or vertical plane. Just move the mouse to one end-point of the line, press the button down and slide the mouse horizontally or vertically to the second end-point before releasing the button. After

you have started to extend the line in a particular plane, LisaDraw knows which way you are going and you no longer need to maintain precise alignment with the first end-point.

The *diagonal line* in the palette allows you to draw a line between two arbitrary points on the drawing paper, and the *curved line* in the palette draws a curved line between two points.

Two other forms of drawing lines are provided, but these are more free-hand in nature. One is expressed by the *polygon* in the palette. After selecting the first end-point of the polygon line sequence, move the mouse to the end-point of the first line and click the button (which draws a line between these two points), move the mouse to the end-point of the second line segment and click the button again (which draws a second line from the end of the last line to the current end-point), and so forth until you eventually return to the starting point of the polygon.

The second form is expressed by the *free-hand* shape. With this facility, a continuous, flowing line is drawn as you move the mouse, holding the button down all the while. When you release the button, it is the same as lifting the pencil off the paper.

You can also convert your drawings into labeled illustrations. After selecting the *text* box, you move the mouse to any location on the paper where you want to type characters and click the button. This location becomes the mid-point of whatever characters you type, so you might place the cursor in the middle of a box or circle or in a strategic location outside of, but near, some shape.

## MEMORANDUM

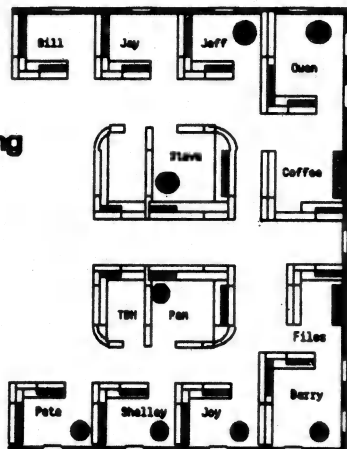
John —

January 27, 1983

Here's a copy of the alternative floor plan for our section. Please look it over. This arrangement would give us more offices with windows, though of course they are smaller than the current layout. It also allows room for 3 more offices. What do you think?

David

### Northeast Wing Building 4



**An office layout.** The various palette shapes can be combined to produce illustrations of a practical nature, as this suggested floor plan shows.

**Manipulating an object.** The final and uppermost box in the palette is an arrow with the appearance of the cursor. When it is highlighted (which always occurs after you have completed any of the other palette operations), you can *select* objects rather than draw them. Why should you want to select something already on the paper? Unfortunately, the answers are almost endless, so we will just have to cover the major points.

Let us suppose that you wish to alter the shape of a box you previously drew on the paper. Move the mouse near one of the lines, while making sure that it is not outside the box, and then click the button. LisaDraw then redisplay the box with tiny black boxes in each corner and another in the middle of each of the four sides, for a total of eight squares. This visually confirms that this object in particular is selected as opposed to any other.

Once an object has been selected, you can perform any of the commands found in the list under the "edit" tag in the menu bar such as cut, copy, paste, clear (erase it but don't put it on the clipboard), and duplicate.

#### You may take several other actions:

- If you move the mouse to the center of the object and press down the button, you can slide the object to a new location before releasing the button, which deposits the object on the paper.
- If you select the middle of the left side, you can pull outward or inward to change the placement of the left edge and the width of the box. Or if you select the middle of the upper side, you can pull it upward or downward from its original position. The same applies for the top, right, and lower sides of the box.
- If you select the upper-left corner of the box, you are selecting simultaneously both the upper and left sides of the box and re-proportioning the box by sliding the corner around

to new coordinates. Here again similar maneuvers can be performed on the other three corners of the box.

Other objects can be distorted into modified shapes by somewhat comparable means. Closed objects have many "touch spots," while the various line forms need only one at each end. All these operations are accomplished with no fuss whatsoever, which is considerably better than trying to re-do an illustration completely by conventional means.

Text can be *re-positioned* in the same manner (though the entire string requires only a single touch point), but it also can have its *properties* of type face and size altered. LisaDraw currently supports the same eleven type styles as LisaWrite:

15-pitch Gothic	10-pitch Modern	1/4-inch Modern
12-pitch Modern	10-pitch Courier	1/4-inch Classic
12-pitch Elite	PS Modern	1/3-inch Modern
PS boldface	1/3-inch Classic	

Furthermore, each type face may be used in such variations as bold, italic, outline, shadow (a black double behind an outlined letter) as well as underline—characteristics contained in the list under the "type style" tag in the menu bar.

**Changing the pen stroke.** Still another form of manipulation involves changing the thickness of the lines used to draw graphics. Once you have selected an object, you simply choose what you want from the list contained under the "lines" tag in the menu bar. The alternatives include:

thin line	black line	no arrows
medium line	gray line	arrows on one end
thick line	white line	arrows on both ends
extra-thick line		

You can try one lineform after another as the object remains selected until you "click" another object or "click" one of the boxes in the palette.

**Adding shading.** When you get ready to apply the finishing touches to an illustration, it is the "shades" facility that adds the "professional" touch. Once you have selected an object of the *closed* variety, such as a box or circle, you can fill it with one of 36(!) different patterns, including white (opaque) and a non-fill clear pattern.

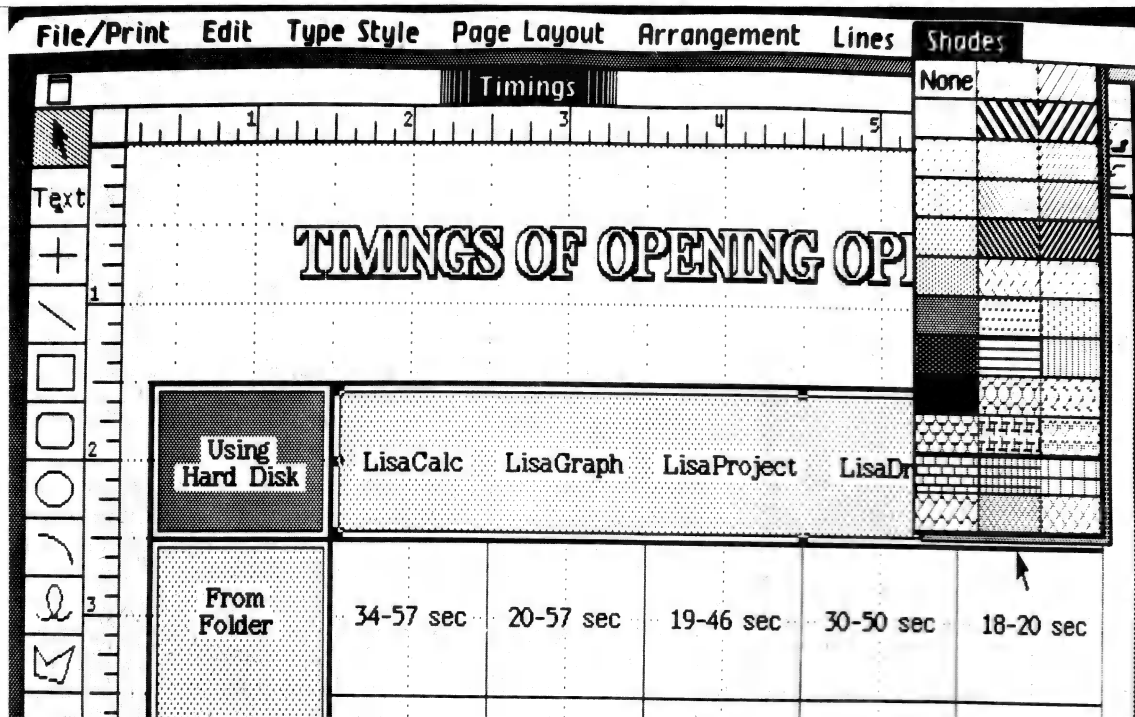
White is useful when the whitened object is placed on top of an object filled with a different pattern. In this case, the white obscures the underlying pattern, as you would hope. Clear is useful when you want the underlying pattern to show through the object on top.

**A second look.** Our description of LisaDraw attests to its flexibility, and we found it remarkably easy to use. As Apple claims, you can learn the basic operations in about 30 minutes. We spent more than a day with LisaDraw, and our appreciation of it *significantly* increased once we had learned its various features. We found ourselves embellishing charts originally created with LisaGraph and LisaProject (to be discussed next) with considerable flair. LisaDraw clearly improves the "professional" appearance of such material.

The range of uses goes beyond enumeration. Perhaps most revealing is its use as a "storyboard" facility for drafting formal presentations or as a way to graphically portray what you want to accomplish (*e.g.*, physically relocate people in your department) for others to review.

We make the unhedged prediction that you will use LisaDraw more than you expect.





35 patterns. LisaDraw provides many patterns to fill in different areas. See the various shadings that have been applied to different portions of this chart (which happens to describe the times required to open documents in an early version of the Lisa software).

## LisaProject

This program schedules and monitors project tasks, milestones, and the allocation of resources within your organization, and presents the status via several forms of graphic charts.

**Starting a new schedule.** After you tear off a sheet from the pad labeled "LisaProject Paper" and display it in a document window, the template of a new project schedule is revealed. After replacing the strings "Title" and "SubTitle" with that of the new project, you are ready to proceed with scheduling the various tasks.

The overall layout of the schedule is fairly intuitive. The project (and time) begins at the left of the chart and progresses to the right. Tasks to be performed in parallel are placed vertically one above the other to reinforce the notion that they are proceeding simultaneously. Every new chart has at least two circles (*i.e.*, *project milestones*), one to designate the starting of a project and the other to designate its ending.

To insert the first *project task*, point the mouse at the empty area between these circles, press the button down, diagonally slide the mouse to draw a flickering box, and release the button. A typing cursor (a blinking vertical rule) will appear in the box so that you can type a task name such as "Do Research," press TAB to jump to the next field, type the name of the person who will do this work, press TAB to jump to the effort field, and type the number of days involved. If more than one person is involved in the same task, press RETURN and type the next person's name and the time they will take, and so on until all are entered. To insert a second task, point at the area between the first task and the last milestone, and follow the same procedure of filling in its scheduling information.

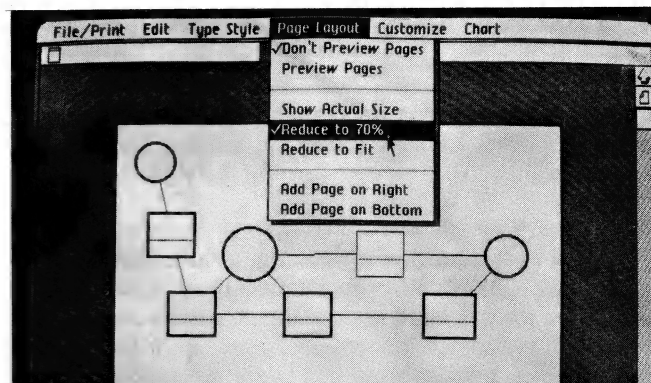
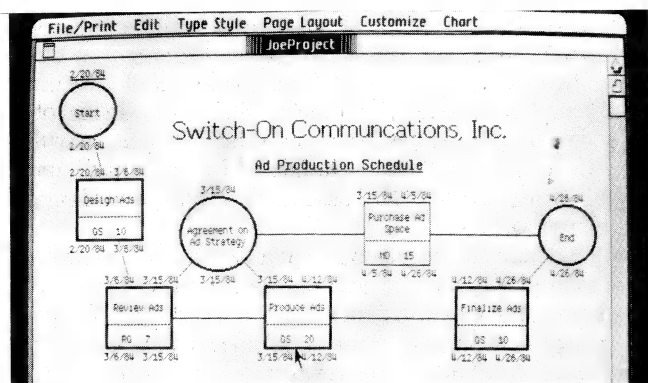
Lines to connect one milestone or task to its successor (in time) are easily drawn. You simply move the mouse pointer inside one of these shapes, press the button and slide the mouse to the next shape before releasing the button. LisaProject will permanently connect them together, and it will remember that the finish date of the previous item determines the start date of the next item. When several parallel tasks converge into a common task (or milestone), the start date of the common task is governed by the latest completion date of all its preceding parallel tasks.

**Altering a chart.** During the course of a project, it is likely that you will have to change the project schedule in any of several ways. One such change involves the creation of an *intermediate milestone*:

- Follow the procedure to draw a box and make sure to type its label.
- Select this box by clicking the button as you point at it with the mouse. Notice that the shape acquires eight tiny boxes (just as it does in LisaDraw) so that you can re-shape or move it.
- Convert it from the task shape (a box) to the milestone shape (a circle) by executing the "Change Task to Milestone" command in the "Customize" command list.
- Select and cut the line connecting the two intervening tasks.
- Connect the previous task to the intermediate milestone, and connect the milestone to the next task.

This sounds somewhat involved, but all this can be accomplished with surprising speed. We tried it ourselves and accomplished the entire sequence of operations in 25 seconds! You can delete any task by selecting it and executing the CUT command.

When expanding a project schedule with additional milestones and tasks, additional space may be needed. Lisa-



**A schedule chart.** *LisaProject* is used to generate a schedule of milestones (circles) and tasks (boxes) in a project. This relatively small schedule can be seen in its entirety when the entire screen is used to display it, but schedules larger than one-half page can be viewed at 70% reduction (shown on the right) or completely reduced to whatever size is necessary to be seen in the document window.

Project lets you add a page to the right or to the bottom of the existing chart as circumstances require. Obviously, this can make the chart so large that it cannot be seen in the document window in its entirety. To get an overview of the whole project, you can ask *LisaProject* to reduce the entire chart so that all tasks and milestones can be seen at once. For less drastic needs, the chart can be reduced to 70% of the current size, and you can instruct *LisaProject* to do this repeatedly to achieve ever smaller pictures. Only when the chart is shown in actual size, however, do text labels, start and finish dates appear for each task and milestone.

Other things about a schedule may need to be altered as well. To change a task name, point at it with the mouse, click the button three times to select all words in the task name and type a new entry. (You also can edit any portion of the field with little effort.) The same applies to the name of a person assigned to a task, and it is a trivial editing procedure to remove someone from a task or add someone else to a task.

If you change the amount of time someone spends on a task, *LisaProject* automatically recalculates the ending date of this task and all succeeding tasks and milestones. Sometimes you want a given task to begin on a certain date because of the overall schedule of the people assigned to that

task (they might be working on another project at the same time), and *LisaProject* provides the "Set Scheduled Dates ..." command to accomplish this.

Because *LisaProject* cannot know in advance about special company holidays or the number of days per week that you are asking people to work (crash efforts are never 5-day working weeks), there is a facility to customize the calendar that *Lisa* uses when calculating the various task and milestone dates.

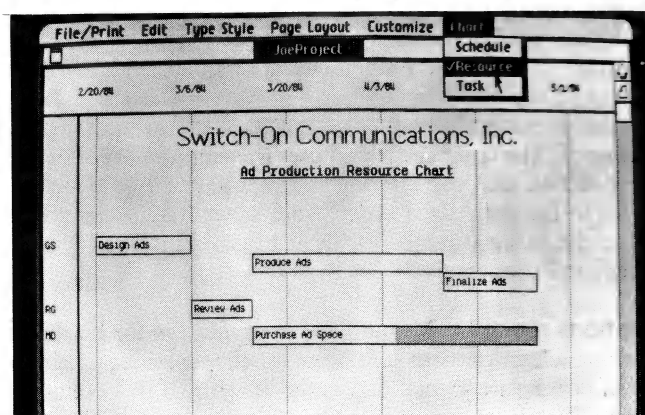
**Other charts.** Besides the *schedule chart* just described, *LisaProject* provides two additional chart forms:

- The *resource chart*, which shows how each person is allocated to the various tasks in the project. A horizontal bar reflects the amount of time a person is spending on each task, against a background calendar delineated into user-assigned intervals of one, two, four or eight weeks.
- The *task chart*, which presents the same information, but it is organized according to the various tasks, showing the assignment of people to them, also using the bar format.

**Visual management.** In spite of the fact that it provides a remarkable array of scheduling facilities, *LisaProject* hasn't provided everything imaginable. For example, it does not maintain a master data base of all projects and the sub-allocations of people to those projects. Thus you must do a comparison check of every project chart and its personnel allocations to ensure that someone is not accidentally scheduled for 100-hour weeks!

Imagine being able to investigate different questions about the timing of a given task or the influence on timing that the re-allocation of human resources might have on that project. This capability provides to project management a similar kind of "what-if?" facility that spreadsheet programs provide to budget analysis and forecasting. Also imagine how quickly you can generate various *LisaProject* charts and include them in your next memorandum.

*LisaProject*, along with *LisaCalc*, *LisaGraph* and *LisaDraw*, will be extensively used by managers and project leaders, in many cases on a daily basis. In fact, it is such a significant application tool that it is likely to become another generic program in the Calc-like tradition.



**A resource chart.** When you want to see what tasks each person is assigned to complete, you can ask for a resource chart. The shaded portion of a bar shows slack time, which is time that might be spent on the task without causing a delay in the overall project.



## LisaList

This program creates, maintains and references personal data bases. Each record is displayed as a row of information organized into columns of fields, producing an image very similar to the spreadsheet orientation used by LisaCalc and LisaGraph.

**Creating a data base.** When you tear a sheet from a completely blank *list pad* and open the document, LisaList displays a form for you to fill in. Into each column you type the names of the various fields separated by a tap of the TAB or RIGHT CURSOR key and concluded by the RETURN key.

LisaList then positions the cursor beneath the field name and asks you to define the type of information to be stored in the field. The default type is *text*, but *number*, *money*, *date*, *time*, *telephone*, *zip code*, and *social security* are alternative forms that LisaList understands. If the type represents a precise data format, that will be displayed in the third row as visual reinforcement and you can edit it into another format if you prefer.

What remains is the entry of information into the new data base, a process started by executing the "show new list" command from the menu bar. This creates the new document, after which the display window shows a single empty record with field titles above each column. Simply select the record by selecting the box at the left edge and type information separated by horizontal tabs and terminated by RETURN.

**Maintaining an existing data base.** The procedure we have just described is used both to create a new data base and to add a new record to an existing data base. To add a new record you simply jump to the last record of the list, select it and begin typing.

But adding new records to the end of a list almost surely places them in the wrong sequence in the list. LisaList ignores this temporary situation because the act of reorganizing the data base after the entry of each new record would create unacceptable delays. Instead, it waits until you invoke the "Show Entire List" command before sorting the list into ascending order based on information contained in the first field. (The process of ordering the list into different sequences will be discussed in a few moments.)

Besides adding new records, you can delete existing ones by selecting one or more contiguous rows and executing the "Cut" command. Naturally, they can be pasted back into this data base or into a different data base if appropriate. And a copying command is available if you wish the original records to remain in the data base.

Records contain fields of variable-length information, so you do not need to be concerned about establishing the maximum width of the field beforehand. When LisaList displays records, the information displayed for each field is truncated to fit within the column width you have allocated for that field. You may increase the width of any column to view the full text of any fields in that column, then decrease the column width so as to fit more columns into your display window. To do this, move the cursor to the field titles and point at the vertical rule separating two columns while holding the button. Slide the rule horizontally to increase or reduce the width of the left-hand column, and release the button to place the rule until you need to alter it once more.

In a similar vein, new columns (*fields*) can be added or existing columns removed as your requirements change. Using the "Add/Remove Columns" command, select from the record template an empty column to fill or an existing column to cut and proceed accordingly. When finished, you will have to execute the "Show Modified List" command, and Lisa will reorganize the data base methodically according to your instructions.

And finally, to revise the contents of a field within a record, you simply select it with the mouse and type the new information. For minor alteration, a second click of the button (after positioning the cursor within the field) enables you to backspace over and/or type text between two characters of that field.

**Filtering the data base.** From time to time you may wish to view the list in alternative sequences. To do this, you first select the "What Order & Format?" command from the menu bar and fill in the template with the necessary information. This includes the sort order for each field involved and whether any of the fields should be made invisible. The definition phase is concluded when you execute the "Show List in Order" command, and a temporarily reordered list will be created.

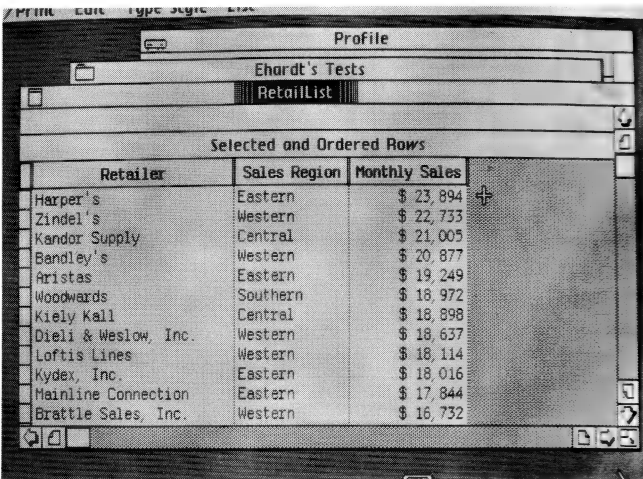
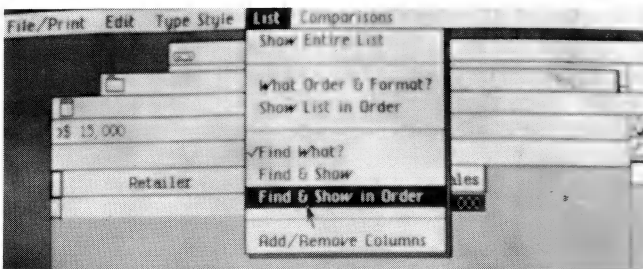
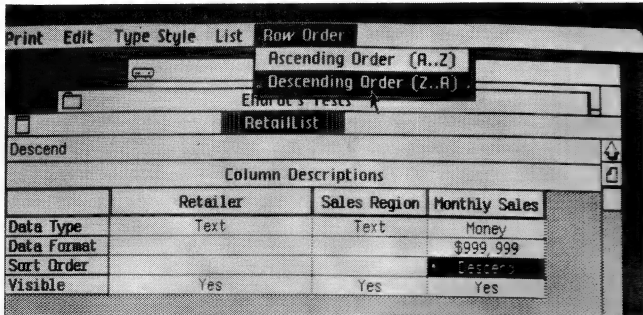
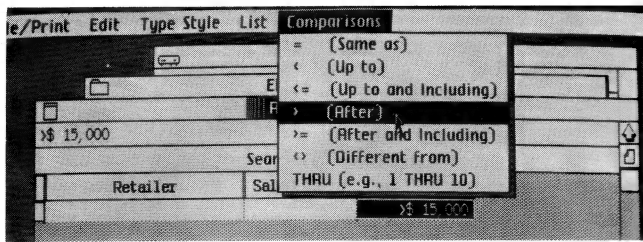
Another important feature is the ability to select certain records from the list, thereby creating a sub-list of the original data base. After selecting the "Find What?" command, a template is displayed with the name of each field and an empty criterion entry beneath it, any of which can be filled with a filtering expression resembling these:

Expression	SELECT this RECORD IF the field contains
= Western	Information identical to the argument.
< 65	Information less than the argument.
≤ 12/31/82	Information less than or identical to the argument.
> 21	Information greater than the argument.
≥ \$20,000	Information greater than or identical to the argument.
≠ Clerk	Information different from the argument.
\$10,000 THRU \$19,999	Information within the range bounded by the first and second arguments.

If you wish more than one field to be used in the search operation, define those fields as well. In any case, a sub-list honoring these filtering criteria is displayed when you execute the "Find and Show" or "Find and Show in Order" commands. The latter command uses the sorting information *in conjunction with* the filtering information to produce the sub-list in the designated order. And, as we have mentioned before, the original list is displayed by invoking the "Show Entire List" command.

**Questions remain.** One predictable application for LisaList requires integration with LisaWrite for the repetitive generation of boilerplate letters. Sadly, the absence of this connection to LisaWrite (or to anything else at this point) is glaringly evident. As a consequence, LisaList is currently irrelevant as a list management tool in the secretarial sense.

On the other hand, it is useful as a personal data base manager, which Apple states is the current objective. And because it runs on a desk-top computer system, LisaList is



**Finding specific information.** Suppose you want to find those records where monthly sales have exceeded \$15,000 per month and show them with the most sales first and least sales last. After choosing the "Find What?" command, you can click the "Monthly Sales" field and define the criteria (first photo) for selecting records. Then choose the "What Order & Format?" command and click the field (or fields) to be sorted and the descending sort sequence (second photo). Finally, execute the "Find and Show in Order" command (third photo) and view the list of retailers with sales in excess of \$15,000 per month (fourth photo).

LisaList remembers previous instructions, so you can alter either the comparison information or the sorting instructions independent of one another.

not designed to handle sophisticated or large data base applications, which are more suitable for electronic filing systems available on large minicomputers or mainframe computers in any case.

So LisaList can handle relatively small data bases of 4,000 to 6,000 records with an average length of 100 characters each, though the maximum number of records and their length is completely variable. The important thing is that a LisaList document is not so large as to prevent its being duplicated onto a single floppy diskette for back-up. Furthermore, LisaList contains a facility for validating information according to simple kinds of type checks that are included with the data base, which is very helpful in ensuring accuracy.

When all is said and done, it is clear that LisaList does not possess nearly the same degree of sophistication and maturity as LisaCalc, LisaGraph, LisaDraw and LisaProject. The idea of having and maintaining personal data bases on a desk-top system is invaluable (though hardly original), and we hope that LisaList will benefit from continued development.

## LisaWrite

This program is used for creating and revising text documents such as internal memoranda and reports as well as conventional correspondence. We think that you will find it is most appropriate for such "every-day" needs rather than for elaborate word processing applications (at least at this time).

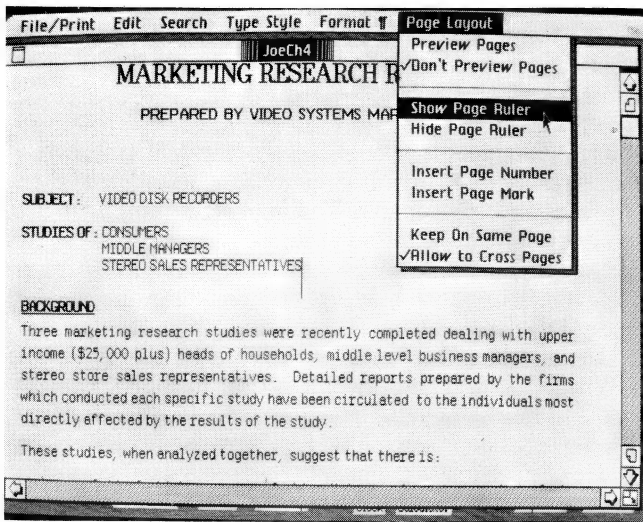
**Editing a document.** LisaWrite is a "document-oriented" (as opposed to page-oriented) system because text is normally presented as a flowing piece of text formatted within left and right margins. You can preview (and edit) paginated text if necessary, but there is no command to jump to a specific page within the document. When you open a document into a screen window, the text of that document flows into the window much as it would on any other word processor.

The cursor reflecting the floating mouse position is "I-beam" shaped to encourage you to position it between text characters. Clicking the button once places a blinking vertical rule at that position to mark your current location in the text. As you type additional text, the blinking vertical rule which marks your position in the text will move with you. The original mouse cursor marker will stay where it was. You can make minor corrections as you type by using the BACKSPACE key to delete characters you have just typed. Any more substantial correction will require fetching the mouse pointer, sweeping it down to the place where you want to make a change, and selecting a new position in the text by clicking the mouse button.

Typing text causes existing characters in the line to be slid to the right and entire words are wrapped to the next line if necessary. Tapping the BACKSPACE key deletes previous characters, and LisaWrite will even "back-wrap"<sup>5</sup> words onto the current line if space permits. Text is always shown in the selected type face and type size (but more on that later), and the bit-mapped display shows accurate renderings of the text during the editing process.

<sup>5</sup> Backwrapping words occurs when enough text is deleted to permit one or more words to be formatted into the shortened line, with rippling effects through the remainder of the paragraph. In this way, you always see the paragraph in its finished form.





**A document-oriented editor.** *LisaWrite* normally shows text as a series of lines following one another (see the check symbol beside the "Don't Preview Pages" command). If we were to select the preview mode, the white space at the top and bottom of each page would appear along with any header or footer text.

**A distinct advantage of a bit-mapped display is that it can accurately represent different type faces, justified lines, actual spacing between lines as well as many other useful things.** The height of the vertical rule following the paragraph ending with "Stereo Sales Representatives" indicates the line spacing separating paragraphs.

During our testing, however, two deficiencies cropped up:

- (1) Characters appear on the screen about as fast as the casual user keystrokes, but someone with professional typing skills definitely can get one or more words ahead of the system. Lisa is no worse in this regard than many other systems with bit-mapped display screens—indeed it is better than most we have tried. Nevertheless the tendency of the display to lag behind what is typed is a clear deficiency for those who are reading the display while they type and not transcribing text from paper (normally with eyes diverted).
- (2) Typing beyond the right edge of the document window automatically invokes horizontal scrolling, which we commend. However, *LisaWrite* does not return the screen to the left margin after word wrapping has occurred. As a consequence, if you have set a line length that is approximately the same width as your display window, you will soon find that *LisaWrite* has scrolled to the right and you cannot see the left-most portion of your document without scrolling back to the left. We found this very annoying.

Replacing text is as simple as inserting it. Again no command need be specified. Simply move the cursor to the beginning location, press (and hold) the button down while you slide the mouse to the last location, at which time you can release it. Text is highlighted during the sliding motion, which can include horizontal and vertical directions. Once you have selected a block of text, any text you type will automatically replace the highlighted text. If you want to forget your change and revert to the original wording, you can execute the "Undo Last Change" command.

Besides this fairly manual method of defining text with the mouse, there are several shortcuts. To select a word, position the mouse anywhere within it and click the button twice in rapid succession. To select the current paragraph, click the button thrice in rapid succession. There is, however, no special provision for selecting a line or a sentence other than the "manual" method described above.

The other editing operations of *LisaWrite* include: *cut*, *copy* or *paste* text—all of which exist in the other programs provided with Lisa. As we have mentioned elsewhere, you simply define the desired amount of text and then select one of these commands from the "Edit" list in the menu bar.

**Positioning within a document.** Naturally you can position within a document via the normal Lisa scrolling operations. You can scroll up or down (toward the beginning or the end of the document) by using the mouse to select the UP or DOWN arrows in the vertical column on the window's right. Continuous scrolling simply involves holding the button on the mouse down while pointing at either of the arrows, but you will find that this is too slow for anything but minor changes in position.

To jump to the next or previous screenful, simply point at the appropriate "page" icons located in the same column. One line from the previous screen is retained to maintain some sense of continuity. For more arbitrary jumps through the document, you can slide a "thumb index" mark up or down the right-hand border of your screen window. *LisaWrite* will move you to the position in the document which corresponds to the position of the thumb index. If it is moved to the top of the area available, *LisaWrite* will move you to the beginning of the document. If it is at the bottom, you will be moved to the end of the document. If it is in the middle, you will be moved to the middle, and so forth.

Horizontal scrolling is restricted to pointing at the LEFT and RIGHT scrolling arrows in the bar located at the bottom of the window. There are no special symbols for moving left or right a window at a time, or "thumb indexes" for setting a relative horizontal position. This is unfortunate since we are used to seeing these icons in the other Lisa application programs and we feel these should be provided in *LisaWrite* as well. Furthermore, horizontal scrolling is a painfully slow process of inching left or right in small increments. *LisaWrite* definitely discourages you from preparing documents which are wider than the screen window you have chosen to use.

**Searching for text.** Yet another way to move to different parts of the document is to search by content. The "Find What?" command located in the Search list on the menu bar displays a dialog box containing both the text to be found and (if appropriate) the text to be substituted. There are other commands which let you specify whether or not you care about an exact match on upper and lower case. After defining what it is you want to find, you may execute a search command such as "Find Next Occurrence." The search proceeds from the current cursor location (the vertical rule, not the I-beam character of the mouse) to the next instance of the string.

If you want to substitute text, you enter the new string in the spot provided in the dialog box. To perform a *discretionary search-and-replace* operation, execute the "Find Next Occurrence" command, wait for the text to be found, and

then execute the "Change This Occurrence" command. In many cases, you will want to change this occurrence and proceed to find the next occurrence. To speed this operation LisaWrite also provides a "Change & Find Next" command.

Naturally, there is also a "Find & Change All" command which performs *global search-and-replace*, starting with the current cursor location and proceeding to the end of the file.

**Typography.** Text can be shown in any of eleven type faces and type sizes:

15-pitch Gothic	10-pitch Modern	1/4-inch Modern
12-pitch Modern	10-pitch Courier	1/4-inch Classic
12-pitch Elite	PS Modern	1/3 inch Modern
	PS Boldface	1/3 inch Classic

Besides the "normal" presentation, you may also specify underlined, italic, emboldened, superscript (raised above the baseline) or subscript (set below the baseline) versions of each face.

You may specify both type face and presentation before typing new material (in which case text appears with the correct properties as it is typed), or you can "select" previously typed text and then specify the type style to be used for that text.

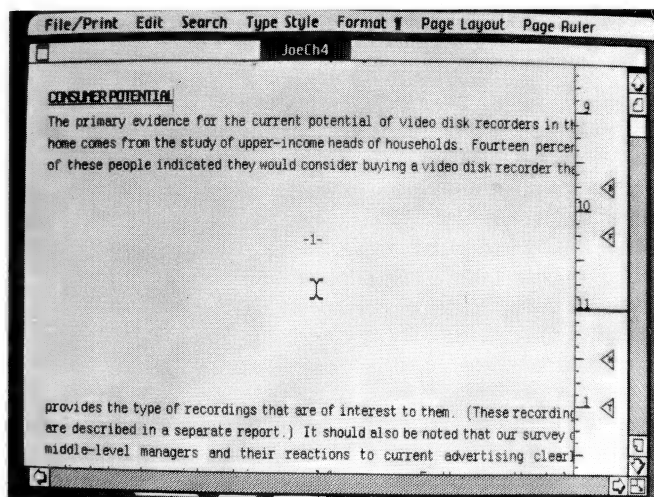
**Formatting paragraphs.** Lisa provides a single margin and tab ruler for setting left and right margins, tabstops and indents. The ruler is normally hidden but you may make it visible whenever you need it. When you select the "Show Margin/Tab Ruler" command from the "Format ¶" list in the menu bar, LisaWrite automatically places the ruler immediately below the line containing the cursor. If you then select different positions within text displayed in the window, the margin and tab settings shown in the ruler will change to indicate the settings in effect at that point in the text.

You may set or clear margins, indents and tab stops by pointing to a position along the ruler and clicking the button to temporarily "spot" the cursor there. You then move to the "Rule" command list and select the appropriate command. Some of the tab stop commands include: clear tab stop or set normal (flush-left), centered, flush-right or decimal tab stops. LisaWrite also permits you to fill the space created by the tab jump with white space, dots, dashes or a horizontal rule.

Other "paragraph format" properties you may select include a choice of flush-left (aligned to the left margin and ragged on the right), centered, flush-right or justified text (but no hyphenation). You can specify that the spacing between lines in the paragraph be single, one-and-a-half, double or triple line spacing. You can also specify that the space separating this paragraph from the following one to be any of these same vertical increments.

To apply new formatting changes to more than one paragraph, select a group of paragraphs or the entire document and then define the desired settings. The new ones will supersede any that existed before.

**Formatting pages.** Just as LisaWrite provides a horizontal ruler for setting the various *width* aspects of the page, there is a vertical ruler for setting page *depth* information. The "Show Page Ruler" command (or its inverse counterpart) is selected from the "Page Layout" list in the menu bar. Activating this command automatically invokes the "Preview Pages" command, so that you see the document in the form of fully



**The page ruler.** When you want to alter the depth of a page or the placement of headers and footers, simply ask for the page ruler to be shown. The margin/tab ruler (not shown here) is displayed laterally across the screen with similar indications of margin positions and tab settings.

composed pages rather than an unpaginated stream of formatted text.

Like the paragraph ruler, the page ruler can have measurement marks in an inch or metric scale. The placement of header lines, beginning and ending of page body, and the footer lines are defined by the position of different triangles placed along the ruler. We were very disappointed, however, to find that changing the position of these "markers" were immediately propagated to *all pages* in the document, not just the current page or the succeeding ones. Similarly, any header or footer text appeared on all pages—even the first page which often is different from the succeeding pages. Moreover, you can instruct LisaWrite to place the current page number anywhere you wish in the page headers and footers, but the fact that the page number always appears in arabic form makes it impossible to use where you might want roman numerals.

When viewing the document in the preview mode, you can manually define the place where a page break should be made by pointing with the mouse and executing the "Insert Page Mark" command. You can also select blocks of text such as numbered or bulleted paragraphs and ask that they be kept on the same page. Without specific instruction, LisaWrite allows text to flow across page boundaries without restriction. *Unlike many systems that provide a preview mode, you can edit text without returning to the unpaginated form of the document.*

**The final word.** LisaWrite is probably no more than an "average" word processing program. We certainly prefer it to most of the word processing packages available for personal computers. And yet LisaWrite must remain competitive in a marketplace where substantial improvements are being made to enhance the features of these programs.

We have already noted that scrolling text in both the horizontal and vertical directions is quite slow. There are, at least, provisions for jumping a screen window at a time or more in the vertical direction. There are no such provisions



for moving in the horizontal direction. Furthermore, LisaWrite does not have most of the features which we now expect to find on the more advanced office word processing systems.

Because LisaWrite is not as good as many word processors, we do not view Lisa as appropriate for someone (such as a secretary) who deals primarily with text. This may be a significant handicap. If managerial level people in an office have Lisas, you would clearly want assistants and secretaries also to have Lisas so that they could contribute to preparation of the same documents. Yet LisaWrite is not as good as many other systems for the other text-oriented jobs which secretaries and typists have to perform.

The particular version of LisaWrite we used in researching this article had more than a few idiosyncrasies that left the screen in surprising states. Undoubtedly, many of these will be removed before customer shipments begin in late spring. Assuming that these bugs are fixed, LisaWrite is adequate for many people who will use word processing facilities fairly casually. This does not excuse its weaknesses. Granted, most people who buy Lisa will buy it because of the other application tools. But whatever else they do, virtually everyone has to prepare text, and we think that the word processing side of Lisa deserves some more development work.

## Printing a document

Before we describe how Lisa prints documents, we want to take a moment to put some issues into perspective.

At one time or another, you want to get a copy of the document onto paper, whether to think about it away from your desk, to circulate it to others, or whatever. In the world of word processing, which often is characterized by typewritten text, the document is printed on a daisy wheel printer or similar typewriter-quality device. Electronic printers also might be used, but their higher cost ensures their use as a shared device for the time being. In the world of decision support systems, an inexpensive color plotter or color-dot matrix printer is becoming more evident for every-day application, while film equipment is used to prepare materials for more formal presentations.

But what if you want to use a single, integrated computer system to produce both graphic and text output? Electronic spreadsheets, lists of information, and written reports are very character-oriented in nature, while business graphics, project charts, and other illustrations are clearly graphic in nature. If a system (capable of handling all these applications) is simultaneously configured with more than one kind of output device, its cost is sharply increased. So, with the inevitable compromises that price constraints bring, Lisa tries to accomplish all this with *either* of two printers.

**The print devices.** Lisa uses either a dot matrix unit (C. Itoh) or a *completely new* daisy wheel printer manufactured by Qume to Apple's specifications. Both units produce graphics as well as text.

The *dot matrix printer* has a standard resolution of  $96 \times 72$  dots per inch, which is used for creating quick drafts, and a higher resolution of  $160 \times 144$  dots per inch for "finished" output. It uses a 9-wire impact printhead and conventional ribbon to print on plain paper. Usually you will use fan-fold (continuous form) paper, to avoid feeding sheets by

hand, but the dot matrix printer can print on individual sheets of company letterhead or the like if the need arises. Its draft mode is rated at 120 characters per second and 70 lines per minute, but the higher resolution print mode reduces speed considerably.

The *daisy wheel printer*, by comparison, has a resolution of  $120 \times 48$  positions per inch (standard for such devices), and it prints straight text at an average speed of 40 characters per second. A very low-cost (always an Apple consideration) single-bin sheet feeder will be available soon, but we have always preferred a dual-bin sheet feeder. What sets this printer apart from other daisy wheel printers is its use of 130-spoke print wheels, including:

- *Apple Modern PS with italics* is used to proportionally print this single type face in upright and italic styles.
- *Apple Modern 10/12/proportional* is used to print this single type face in the upright style in any of three pitches.
- *Apple Modern 10/12 with additional characters* is used to print this single type face in two pitches. All of Lisa's 168 symbols can be printed, in some cases by overprinting several characters to form a composite character.
- The "conventional" typewriter type faces of *Courier 10*, *Prestige Elite 12*, *Gothic 15*, and *Executive PS*.

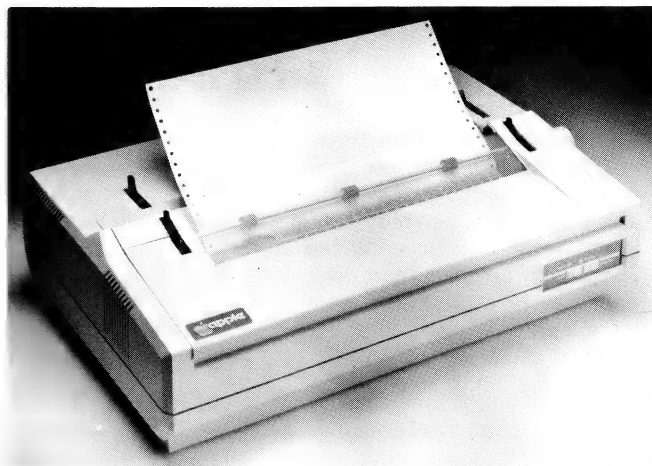
As we have already said, both printers can be used to produce text and graphics. Nevertheless, we expect a large percentage of the installed Lisa base to have the dot matrix printer, because it is considerably less expensive than the daisy wheel printer (\$695 plus \$195 for the parallel interface versus \$2,195) and many people will not need typewriter-quality output. The output from the dot matrix printer is surprisingly good, as our sample shows.

Whenever documents *must* be printed with fully-formed characters to achieve typewriter-quality, the daisy wheel printer is the logical choice. This unit also can print charts and larger type faces by printing dots using its slightly smaller period (30 mm. as opposed to 34 mm.), but we noticed that the repeated printing of dots causes the ribbon to smudge the paper.

Overall, the dot matrix printer is best as a graphic printer and the daisy wheel printer is best as a typewriter-like printer, but each does the best it can to produce everything within obvious limitations.

**Starting the process.** A document can be printed when it is open and its contents are visible in the "active" window, but not while it remains an icon in a folder or on the desk-top. To print this document, move the mouse to the "File/Print" tag in the menu bar and select the "Print ..." command from the list. Lisa overlays the upper portion of the display with a printing menu that outlines the various choices available to you:

- Whether the document is printed in *finished quality*, with graphics and elaborate type faces included, or as a *quick draft* without the graphics and with mostly surrogate letters. Quick draft is indeed considerably faster than the finished quality mode. One LisaProject sample which we timed took 17 seconds to print out on the dot matrix printer in quick draft mode and 77 seconds to print in the finished quality mode.
- Whether the document is printed in the foreground *while you wait* or in the background *while you work* on other things. Even in the background mode, Lisa will not queue



**Two printers.** The dot matrix printer (above left) is inexpensive and best suited for graphic output, while the daisy wheel printer (above right) produces typewriter-like output.

**Below:** The dot matrix print sample, shown here at 100% and 400% of actual size, demonstrates the versatility of this unit, though the dots are apparent even at a glance.

### CONSUMER MARKET

<b>Total U.S. Households:</b>	76 Million
with incomes > \$25,000	13.8 Million

#### Consumer Interest in Purchasing

Definitely interested	8%
Probably interested	6%
Significant interest	14%

#### Calculation of Current Potential

Definitely interested	(8% of 13.8 Millio
Probably interested	(6% of 13.8 Millio
Total interested	

**Consumer Interest**  
**Definitely**  
**Probably**

multiple jobs to be printed. That is, it will not accept a second printing job until the current one is completed. Since we prefer the slower-speed, higher-quality mode for printing, we would much prefer to be able to queue up several jobs to be printed so we do not have to wait for one job to finish before submitting the next.

- Whether *all pages* or a specific *group of pages* are printed. In the latter case, you can only specify a contiguous group of

pages, which means that several individual (and non-contiguous) pages must be printed through separate requests. This can be a problem since only one item can be queued for background printing.

- Whether only *one copy* or as *many as ten copies* are to be printed. Lisa implements this by a series of ten check boxes and you choose the desired number of copies.

**Status of printing.** If you are printing a job in the foreground mode, Lisa reminds you that it is occupied with the job at hand. However, we were surprised to find that Lisa ignores the number of requested copies in foreground mode and only prints a single copy. We admit it is not advisable to print multiple sets in foreground, but we certainly expected a message alerting us to the fact that it does not print multiple sets in the foreground or that it has automatically converted the job to the background mode.

If you are printing in the background mode, you can select the "Monitor the Printer ..." command from the "File/Print" list to check on the progress of the job. A status box is displayed showing which copy of a numbered set of copies and which page of a numbered set of pages is being printed at this moment. The job can be terminated or you can proceed with other work once again. But imagine our surprise, while we were working on other things, when Lisa whistled at us to let us know that all was not right with the printer (it was powered off)! We wouldn't have believed it if we had not heard it ourselves, and it surely brought us out of our deep thought, but we think the whistle might be *a bit too cute* for most people's tastes.

### Networking

Apple will provide a wide array of communication facilities for Lisa. These include basic forms of data communication to other systems, a low-cost network for interconnecting any computer systems made by Apple into a cluster, and an Ethernet network for combining clusters into larger networks.



## An Open Software Architecture

Until recently, the "norm" in the personal computer field has been a common operating system (e.g., CP/M) under which the user could run different application programs. This sort of "open-ended" system has the virtue of making it easy for innovative software companies to develop new application programs and offer them for sale as separate packages. However, it has meant that the user has had to learn a different "user interface" for each application program he uses. And, he is rarely able to transfer data from one application to another.

In the past few months, a number of vendors have offered application programs which combine several functions into a single program (e.g., Context MBA and Lotus 1-2-3). Such "closed-end" software packages avoid the different user interfaces that result from a multi-vendor environment, and provide better integration between a restricted set of applications, but they also offer less diversity in functionality. Future enhancements, of course, can lessen this problem.

A third approach has been exposed by VisiCorp with its promised VisiHost operating system interface and Visi<sup>ON</sup> user interface. These are supposed to provide a much more comprehensive operating environment than, say, CP/M, a common user interface for all application programs and the promise of at least some ability to transfer data between applications. The penalty for the independent software company is that it will have to learn to work within the complete Visi environment. Visi has asked prospective software vendors to discuss with Visi what they intend to do before they set off to do anything.

Lisa provides, if anything, a more complete environment than does Visi. It contains a single-user, multi-process oper-

ating system surrounded by graphic support routines, font management, and various data management facilities. The "finishing" touches are provided by office application tools like LisaCalc, LisaGraph, LisaDraw, LisaProject, LisaList and LisaWrite.

Apple is supplementing this "environment" with numerous communication facilities to expand Lisa from a "personal office system" into a "virtual office system" interconnected with other computers. Clearly Apple is serious when it says that Lisa will be the first of a new generation of products.

**The Toolkit.** As part of its open-ended software architecture, Lisa eventually will be able to run programs written by other software developers and users. To this end, a Lisa Applications Development Toolkit will be available in late 1983, and the price list we have included mentions the cost for the BASIC-Plus, Pascal and COBOL languages for Lisa.

**An OEM box?** Apple also plans to support Digital Research in its effort to bring the world of CP/M to Lisa and similarly support Microsoft in its effort to provide Xenix, its variant of the Unix operating system. It will thus be possible to run software developed for these operating systems on Lisa. However, to get the real benefit of the Lisa environment software companies would need to use the Apple Toolkit and develop programs specifically for Lisa.

Developing the Toolkit will be quite a task, so we can understand why it will not be available for a while. We still think that this is unfortunate. Lisa offers a lot of hardware and software capability and would make a marvelous OEM platform for a variety of applications.

**LisaTerminal.** This program will be available when Apple begins first shipments of Lisa to its customers. *It provides complete device protocol emulation of ASCII TTY, DEC VT-52 and DEC VT-100 terminals.*

Using one of its two RS-232 interface ports, Lisa can be directly connected to local computers at speeds up to 19,200 bits per second. When used to communicate with remote computers over telephone circuits, it can operate at 300 or 1,200 bits per second, and it can automatically dial a previously stored number which you can change at will.

The user interface of LisaTerminal is strikingly similar to the other Lisa application programs. Opening the special communication icon into a document window establishes the transmission link and creates an environment where keystrokes are sent to the other computer system and received characters are shown on the display. The window, then, behaves in every way as if it were the viewing screen of the specified type of terminal, completely eliminating the need for an extra terminal on your desk.

Information stored in LisaCalc or LisaWrite documents can be sent to the remote computer by first copying it to the clipboard and then pasting it into LisaTerminal. And since LisaTerminal keeps a transcript (in its document) of the

information received from the remote computer, this information can be copied and pasted into LisaWrite documents.

**IBM emulation.** A number of programs for emulating various IBM device and communication protocols will be available later in 1983:

- *Lisa3780-RJE*, emulates the IBM 3780 Remote Job Entry station with card reader and printer unit.
- *Lisa3270-BSC*, emulates the IBM 3271 Cluster Controller with IBM 3277 interactive display terminal and 328X printer, and communicating via the binary synchronous (BSC) protocol.
- *Lisa3270-SNA*, emulates the IBM 3274 Cluster Controller with IBM 3278 interactive display terminal and 328X printer, and communicating via the SNA/SDLC (System Network Architecture, Synchronous Data Link Control) protocol.
- *Lisa3278*, emulates the IBM 3278 interactive display terminal directly connected to an IBM 3274 or 3276 Cluster Controller.

**AppleNet.** Apple wanted a local area network that was reliable, simple to install, easily extendible, and which

### A Cloudy Crystal Ball?

In an article appearing in the *Wall Street Journal* on January 4th, an industry analyst was quoted as saying that "what's really exciting is the Macintosh, because it has the nicer features of Lisa but at a cheaper price." We cite this opinion as characterizing many of the rumors running rampant in the industry about the existence of an unannounced Apple system code-named Macintosh. Though no one publicly knows what Macintosh entails, many people (ourselves included) are understandably tempted to gaze into the crystal ball to foresee the future.

Whatever Apple's plans are, we think it extremely unlikely that it would introduce a similar product that would undercut their Lisa system so soon after its costly development and introduction. Indeed, we cannot see the benefit that would be gained by such action. So, whatever Macintosh may turn out to be and whenever it finally appears, we think it is more likely that it will be clearly differentiated from the Lisa offering.

would cost less than \$500 per connection. The result is AppleNet, which is scheduled for general shipments in late 1983.

AppleNet is patterned after the Ethernet standard, with seven layers of network protocol. It uses a baseband, CSMA/CD convention for transmitting information at a rated speed of 1 million bits per second. Each AppleNet will support no more than 128 devices. Devices are connected to cluster boxes. In order to keep the per-device cost down, each cluster box will support up to four devices. These cluster boxes, in turn, are interconnected by twin-axial cable to form a network of up to 2,000 feet in length. The restrictions of length, speed and number of nodes makes AppleNet appropriate for several dozen active systems and inappropriate for large, "campus-style" networks.

**Ethernet.** As a result of a recent agreement with 3Com Corporation, Apple will also offer Ethernet-compatible interfaces. These will operate at the full 10 million bits per second Ethernet transmission speed. All Apple products will use a parallel port to connect with the 3Com Ethernet interface box.

### Sample Prices

<b>Lisa Office System</b> with Motorola 68000 microprocessor, 1 million char. RAM, 720×364 pixel display, keyboard, mouse, two 5¼" floppy diskettes (2×680,000 char.), 5¼" ProFile hard disk (5,000,000 char.), 1 parallel peripheral port (disk), and two RS-232 serial ports	\$9,995
Parallel Interface Card (needed for Dot Matrix Printer)	195
Dot Matrix Printer (parallel interface)	695
Daisy Wheel Printer (RS-232 interface)	2,195
<b>Software:</b>	
LisaTerminal	\$295
BASIC-Plus	295
Pascal	595
COBOL	995

### What does Lisa offer?

As you have certainly gathered by this point, we are quite impressed with Lisa. We are impressed with it both as a technical achievement and as a productive professional tool. It is hard to compare Lisa with anything else on the market because, at the moment, there *is* really nothing else like it.

In the first place, the Lisa working environment really is seductive. Once you have gotten acclimated to it, we think you will find it both natural and easy to use. We have long felt that most of the operating conventions which personal computer users have had to put up with are terrible. The industry should not expect people to have to learn to type CP/M commands and continually swap floppy disks in order to get the benefits of desk-top computing power. Lisa (along with the training materials which support it) is, in this respect, truly a "new generation system."

In the second place, Lisa provides an impressively complete collection of application tools—all of which share a common user environment and all of which are controlled by the same command procedures. There is no other desk-top system which offers the full range of functions available on Lisa. In fact, some of the key Lisa capabilities (such as LisaProject) are not available with the same panache on any other system. Others (such as LisaDraw) are available only on much more expensive systems.

Thirdly, inexpensive graphic printers allow individual users to produce acceptable hard-copy output of all of the fancy things they have done on Lisa.

Finally, Lisa promises a comprehensive approach to communications: a truly inexpensive local area network, full Ethernet communications, mainframe data communications capability, and remote transmission capability. Again, all of these function within the common Lisa user environment. And, the user can transfer data between the communications program and other Lisa application programs.

**Strengths and weaknesses.** Among the six basic application programs we tested, we think that LisaCalc, LisaGraph, LisaDraw and LisaProject are the strongest and represent the real reasons for buying the machine. Taken together, these programs (and especially LisaDraw and LisaProject) will allow you to do things you probably could not do before. They will also encourage you to communicate information in a far more visual form than you had in the past.

We think that LisaWrite and LisaList are the weakest of the programs. We include LisaWrite in this category because it is still too slow and cumbersome to qualify as a first-rate word processor. We include LisaWrite and LisaList taken together because they do not even provide a mail merge facility. Until these programs are improved, it is unlikely that someone is going to buy a Lisa to use primarily as a writing tool or as an office word processor.

At the moment, therefore, we view Lisa as an excellent tool for people who deal primarily with numbers, project scheduling, memos and other documents of modest length, and interaction with mainframe and minicomputer systems. It is less enticing for people who must continue to deal with large volumes of words. One problem Apple will face is that many offices contain both types of people. The ideal office machine would be strong in all functions so that everyone could use compatible systems.



## Is it worth the price?

The strongest criticisms of Lisa have focused on its \$10,000 price tag. In order to decide for ourselves how this really compares with other desk-top systems, we priced out "comparable" hardware configurations available from major office systems vendors. We turned up some surprising information, which we have summarized for you in the accompanying chart.

	IBM PC	DEC 350	Wang PC	Lisa
Processor	8088	LSI 11/23	8086	68000
Base-level memory	64K	256K	128K	1,024K
Operating system	PC-DOS	P/OS	MS-DOS	Apple
Display (mono)	720 × 350	920 × 240	(hi-res)	720 × 364
Keyboard	Yes	Yes	Yes	Yes
Mouse	No	No	No	Yes
Floppy disks	2 × 320K	2 × 480K	2 × 320K	2 × 860K
Hard disk	5,000K	5,000K	5,000K	5,000K
RS-232 port	2	2	1	2
Centronics port	No	No	Yes	No
Incl. editor	No	Yes	Yes	Yes
Incl. spreadsheet	No	No	Yes	Yes
Incl. (other appl.)	No	No	No	4
<b>Base price</b>	<b>\$6,395</b>	<b>\$8,495</b>	<b>\$8,945</b>	<b>\$9,995</b>
Add-on memory	512K	768K	512K	0
<b>Total Price</b>	<b>\$9,055</b>	<b>\$10,880</b>	<b>\$12,445</b>	<b>\$9,995</b>

**Note.** The IBM PC prices are extremely difficult to generate because IBM does not manufacture everything that we required in the configuration or costs too much to include. Many people are configuring IBM systems with equipment made by independent vendors, a practice that we followed in compiling these prices.

If you examine this table, you will probably decide that these systems are more expensive than most people appreciate. This is especially true when you consider the additional cost for software. As you will note, none of the other systems include nearly as much application software as does Lisa. The least expensive system (the IBM) includes *no* application software. *So, while the price of the entry-level versions of these system is low, the price of a more realistically configured system is not low.*

In this context, Lisa appears to be very attractively priced indeed. For \$10,000 you get a fast Motorola 68000 processor, 1 million(!) characters of memory, a high resolu-

tion bit mapped display screen, a mouse, two high-capacity floppy disk drives, and a 5 million character Winchester disk drive. On top of all this hardware you get what must be hundreds of man-years of software in the Lisa operating environment and the six applications programs—a couple of which have currently no counterpart at any price on any competitive system.

**Will people buy it?** OK, so Lisa is a good value. But will anyone pay \$10,000 for a system for one person? As nice as Lisa is, might not companies or individuals decide that they can perform the essential functions (spreadsheet calculations, text processing etc.) on a \$4,000 personal computer, or even a \$2,000 unit?

To be frank, we do not know the answer to this question. There have not really been any previous products which might give us a clue. On one hand we argue with ourselves that there is not yet much evidence that companies are willing to spend much money to improve the productivity of professional workers whose productivity they cannot measure. On the other hand it is entirely possible that many people may see that Lisa is likely to be used much more extensively than is a less expensive personal computer, that it can do more things better and faster than can the personal computer, and that it can be used effectively by people who might never get the hang of a more traditional personal computer. (All of which we believe to be true.)

## What Lisa means

We frankly do not know how many Lisa's Apple will sell in the coming year. It is, after all a new vendor (for this market) offering new concepts at a new price level. We would not be surprised if the machine got off to a somewhat slow start.

However, we think that Lisa is fine machine, worth every penny of its price. It is also, as we said at the outset, an "event" of the first magnitude. With Lisa Apple has set standards which other companies are going to have a hard time matching.

*Joseph L. Ehardt*

## The Apple II is born again

On January 19th the Apple *Ile* was introduced worldwide, with different keyboards supporting various foreign languages as well as appropriate color video circuitry for different national standards. The new *Ile* (for enhanced) succeeds the Apple II and Apple II Plus, of which 750,000 have been sold.

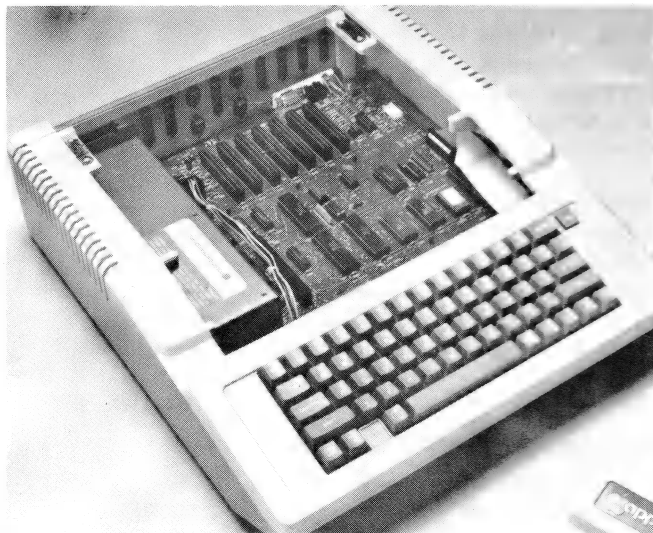
The *Ile* includes the system, 64K of RAM, an enhanced keyboard with full ASCII, and a 40-column upper/lower case character generator. A low-cost add-on card for 80-column text lines is available, and there is another version of the 80-column card with an additional 64K of RAM. The *Ile* also has eight expansion slots for other peripheral interfaces, and one is used for the optional 80-column card. To make for easy and reliable connection of other devices, the back panel slots of the *Ile* have been redesigned to accept standard "DB" cable connectors.

The real technical achievement of the *Ile*, however, is the replacement of 80 separate integrated circuits with two LSI (large scale integrated) circuits designed by Apple's engineers, reducing the total number of "chips" on the computer board from 109 to 31. At the same time, the *Ile* maintains software compatibility (with minor exception) with the II and II Plus so that thousands of existing programs can be run on the *Ile*. Independent software producers, however, will produce new versions of their programs to take full advantage of the system's enhancements.

Apple has painstakingly prepared a completely new set of documentation to supersede the original literature, which already was highly regarded within the industry.

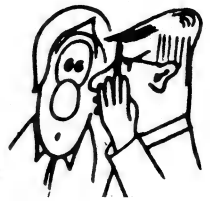
The suggested retail price for the basic *Ile* is \$1,395, while the *Ile* Starter Kit will sell for \$1,995. The latter includes the system, 64K of RAM, one Disk II 5.25" floppy diskette drive with controller card, an 80-column card, and a 12" monochromatic monitor with stand. The 80-column card, if bought separately, will sell for \$125, while the enhanced 80-column card with additional 64K of RAM will sell for \$295. Also available will be new versions of the Apple Writer II (\$195) and Quick File II (\$100) programs.

What is the upshot of the new *Ile* announcement?



**Apple *Ile*.** We normally don't show the inside of a computer system, but the real story of the Apple *Ile* is the new integrated circuits that drastically reduce the number of "chips" on the computer board. The outside of the *Ile* has been changed as well, so don't feel you have to be an engineer to appreciate the big improvement.

## The Last Word



- Apple has a rejuvenated product to continue the tradition established by one that was getting a bit dated, and Apple now will sell even more of the total system. Both should help revenues continue at a remarkable rate.
- Dealers will be very happy, since the new *Ile* will provide them with a system possessing features backed by Apple that previously were had only by installing other vendors' interface boards. And since many of these same dealers will not be offered the opportunity to sell Lisa in its introductory year, they are grateful for a rejuvenated product to sell.
- Independent software vendors also are relieved that the machine on which their software operates has not been abandoned by Apple.
- Customers will find comfort in buying a system with fewer boards designed and manufactured by other vendors, and the enormous software base of the Apple II series is immediately usable.

The consequence of all this is the Apple *Ile* should be a commercial success in 1983.

## I'm not Lisa—my name is . . . Rover?

Rumor has it that IBM is on the verge of announcing a new personal computer/workstation aimed at the 3270. According to EMMS, an industry newsletter, the new device, code named Rover, will be priced at around \$5,000. IBM seems to be offering a major competitive challenge to Apple's new Lisa, selling for almost twice as much.

EMMS anticipates that Rover will contain a 10,000-character flat-panel plasma display and a built-in 5 Mbyte mini-Winchester disk drive.

IBM apparently will also challenge manufacturers of 3270-compatible terminals by drastically reducing the price of the established IBM 3270 product line.

## IBM and Intel unite

The ever increasing threat of a Japanese technological invasion and dependence on foreign suppliers of vital electronic parts is prompting thoughts of possible alliances in Europe (TA and Olympia, AT&T and N.V. Philips, etc.) as well as in the U.S. One alliance recently became a reality here: IBM purchased 12% of Intel, a major U.S. chipmaker, and financial analysts, consultants and industry experts still have not stopped speculating on the long-term implications of this move: will IBM be privy to Intel's long-range plans before that information is imparted to other chip buyers (only 13% of Intel's sales went to IBM in 1981)? Will IBM continue to increase its share of Intel stock, eventually acquiring the company altogether (IBM has agreed not to increase its holdings to more than 30%)? Will this move jeopardize the relationship Intel has with other buyers?

At the moment, no one has the answer to these questions. What is evident, however, is that Intel now has more money available to increase its R&D efforts—and money is a very necessary commodity if the company wants to achieve the rapid advances this vital technology needs in order to stay competitive.



## The Eagle 1600

One of the new products shown at Comdex this year was the new Eagle 1600 family of 16-bit machines. According to Eagle this new series offers the features of the IBM personal computer combined with greatly increased speed, memory and storage.

The 1600 series is designed as a fully-upgradeable system with multiple hardware and software options. The introductory version, model 1600, offers 128K of random access memory (RAM), one 5¼ inch floppy drive storing 780K of formatted data, and one Winchester hard disk drive storing 10MB of formatted information. The Eagle 1600 is expandable to 512K of RAM and the disk storage is expandable with additional hard disks up to 40MB.

The 1600 series uses the Intel 8086 microprocessor operating at 8MHz for greater processing speed. (The manufacturer claims that it runs three to four times faster than the IBM PC.) Eight expansion slots are provided that will accept an IBM plug-compatible memory and I/O boards. The boards that are, or will be, available from Eagle include serial port, parallel port, an SA/SA adaptor for adding hard disk storage, a LAN adaptor for high-speed local area networking, a VCR adapter for video tape back-up of hard disk storage, and a video/graphics controller which provides for the full IBM character set plus a 720 × 352 pixel graphics mode.

The system includes a Microsoft MS DOS operating system which allows the use of any IBM personal computer software. An optional operating system for this machine is MP/M-86. The basic price of the machine includes word processing software and a financial planner of the VisiCalc/Multiplan type. The word processing package is an upgraded version of "Spellbinder," which Eagle has been furnishing with the Eagle 2 machines. The key caps are engraved with not only the normal character assignments but also with the command functions used in the Spellbinder program.

Graphics are offered as an option, either in black and white or color. Black and white graphics are of extremely high quality, consisting of an 80 column × 25 row text display, a 9 × 14 character dot matrix, and a 720 × 352 pixel representation for illustrations.

In addition to the black and white monitor, Eagle plans to market an amber display for those who prefer it.

The Eagle 1600 is billed as part of a multi-user networking system with a top-end capability of up to 64 devices, which can be comprised of both 16- and 8-bit terminals, as well as modems and printers. The first offer will be a serial interface card, and Eagle stations which will allow up to four users.

The keyboard layout differs from the IBM PC in that there are 15 programmable keys across the top and an additional ten clustered between the keyboard and the numeric keypad.

The Eagle 1630 complete as described above including the Spellbinder™ and a financial planner on the order of VisiCalc has a list price of \$6,995.

This Report will be taking an in-depth look at this and other IBM look-alike systems in future issues.

Eagle is a division of AVL (Audio Visual Labs) of Los Gatos, California.

## Olivetti and Officesmiths swap deals

Officesmiths' Electronic File Cabinet™, a UNIX-based software product from Ottawa's Officesmiths Inc., will be marketed by Olivetti Canada. Olivetti Canada, often thought of as an office products company, actually receives 65% of its revenues from the data processing sector. The Officesmiths software package

is seen by Olivetti as a basis for an office applications development program on its new L1 range of microcomputers (M30 & M40) to target specific vertical markets.

On the other side of the deal, Officesmiths' Electronic File Cabinet, a document-based management system which integrates different office applications with a common user language, will undergo a two-year field testing period in the Government of Canada's Department of Energy, Mines and Resources. Olivetti hardware has been chosen for this pilot project. Officesmiths President, Glen McInnes, remarked that his company's text storage and retrieval software will run on any microcomputer running the UNIX operating system, but chose the Olivetti machines (the M40—big brother to the popular M20) for this field trial.

The Electronic File Cabinet from Officesmiths will be made available to other hardware suppliers using the UNIX operating system as well. It was conceived and developed as a file management system for handling large numbers of documents (20,000 in Dept. of EMR application described above). But, in addition, the Officesmiths software environment provides a consistent user interface (in a multi-windowing environment) for other third-party or vendor-created applications.

An interesting comparison might be made between the VisiON software announced by VisiCorp in December (See Vol. 6, No. 1, p. 18) and Officesmiths' offering. VisiON also provides an integrated software environment within a multi-windowing context with a common user interface; however, the thrust in that product is more heavily oriented towards personal decision support functions such as spreadsheet analysis, and business graphics, whereas Officesmiths' offering is oriented toward document-based situations yet, will accommodate spreadsheet and decision support applications written by others. Although Officesmiths sells its software on an OEM rather than on an end-user basis, by the time a customer receives his copy of the Electronic File Cabinet Software from his system supplier, he will probably be paying about \$5,000 for the document management system and integrated software environment. (Officesmiths, Inc., 331 Cooper St., Ottawa, Canada K2P 0G5. Tel: 613-235-6749.)

## Wang bridges communications gap

Three enhancements to Remote WangNet, Wang's wide area network system, expand the resource and information sharing capacity between large and small office systems in remote locations. Previously offering six secondary system connections in a VS primary configuration, now up to 20 workstations may be attached. In addition, a new OIS-to-OIS configuration permits batch file transfer sessions between secondary systems without requiring the use of a VS primary system. The third enhancement permits attachment of the OIS 105, the low-end member of the OIS series of small business computers, thereby providing a less expensive option for remote workstations.

The VS primary, OIS secondary, and OIS 105 support packages are available now; OIS-to-OIS will be ready late '83.

## Wang Labs satellite link-up

A bit of news that slid by us was the agreement between Wang Labs and United States Satellite Systems, Inc. The agreement, which includes a joint marketing/technological exchange, calls for Wang to acquire a minority ownership position in USSS, and to acquire satellite transponder capabilities from that firm. USSS's satellites will be launched in 1986. They will offer Ku-band high-frequency capabilities—users will be able to employ inexpensive ground stations (small dish antennae) even in congested metropolitan areas.

## Computer supermarket

BOSCOM, the international computer and communications marketcenter, has added IBM, Burroughs, Western Union, Philips, France Telecom and over 60 other major companies to the list of permanent showrooms for the 1984 opening of the Boston based "Super" computer market. In addition, eight major management and industry associations, including The Administrative Management Society, The Office Automation Society International, and The Association for Educational Communications, have committed to holding annual conferences at BOSCOM.

## Machine of the year!

For those of you who fear man's being replaced by machine, *Time* Magazine has added ammunition to your phobia. *Time's* bid for 1982's man of the year? The computer. *Time* states that the most significant force in this year's news is not a single individual but a process, and a widespread recognition by a whole society that the process is changing the course of all other processes. Thus, *Time* has named 1982 the year of the computer.

With computer games playing a significant role in familiarizing the public with the computer industry, we should probably give thanks that the man of the year was not Pacman!

## COMPAQ goes retail

The COMPAQ Computer, a 16-bit portable system that can run all the popular software programs available for use with the IBM PC, will now be available at Sears Business System Centers as well as 10 other computer specialty retail stores across the country.

## New Prolink distribution arrangement

Since we last described the Prolink system (see Vol. 5, No. 11, pp. 29,30), that company has entered into an agreement with InfoServ of Ann Arbor, Michigan. The agreement calls for InfoServ to establish a network of independent dealers located primarily in secondary areas throughout the U.S.

## Quietwriter dies quietly

Remember the Quietwriter, a single stylus printer introduced by Centronics a couple of years ago? That company has now disbanded the project to turn that product into a reality.

## News on the PC front

Many companies are standardizing on desk top computers for use by managers and professionals; **Ford Motor Company** is no exception. What is surprising, however, is Ford's apparent decision to go with the 16-bit professionals from **Victor** (formerly Sirius), when most other firms have chosen to standardize on IBM and Apple PC's.

Readers of the IBM **PC** Magazine may be disconcerted to hear that when that periodical was sold recently to Ziff-Davis publishing company, the entire editorial staff refused to go along with the deal. Instead, they made a separate deal with Pat McGovern, chairman of CW Communications (which includes *ComputerWorld*, *InfoWorld*, and *International Data Corp.*, among its many properties). A new company has been formed, called PC World Communications, to launch a new publication called **PC World**. The publisher and editor-in-chief for the new magazine is Dave Bunnell, the founder of both *PC* and *Personal Computing* magazines. *PC World* will begin publication in the U.S. this month with an initial print run of 100,000.

## Lanier earnings drop for second quarter

Even though revenues increased slightly (4.5% from \$90.2 million to \$94.3 million), Lanier announced that profits fell 55% in the second quarter and tied this drop mainly to lagging product sales, unrealized profits in inventory from AES (Lanier still owns approximately 37% of AES), high interest expenses, a general weakness in the economy and price cuts in the Office Systems Division due to strong competition. Earnings fell from \$7.3 million or 48 cents a share during the same period last year to \$3.3 million or 22 cents a share, unhappy news for Lanier stockholders.

Over the last six-month period, earnings dropped 34%—from \$9.6 million or 64 cents a share to \$6.3 million or 43 cents a share, with an increase in revenue of 9.9% to \$174.3 million from \$158.7 million.

**NBI**, on the other hand, expects to increase both revenues and profits for the second quarter a hefty 40%—which would mean a net income of \$3.6 million or 39 cents a share compared to \$2.6 million or 28 cents a share last year, and an increase in revenues from \$24.6 million to \$34.4 million. Like Lanier, NBI is also contemplating price cuts on hardware and software—could this be in anticipation of a new product line announcement?

**CPT** expects an increase of between 25% and 30% in revenues, and an increase in earnings of 28+ cents vs. 24 cents per share last year.

## Kvamme joins Apple in high-level post

E. Floyd Kvamme has joined Apple Computer as executive vice president of marketing and sales. He will oversee worldwide sales, distribution, merchandising and market development operations, and become chairman of the corporate marketing council. He will report to "Mike" Markkula, president and chief executive officer.

Mr. Kvamme formerly was president of National Advanced Systems, a wholly-owned subsidiary of National Semiconductor Corporation.

## CPT adds low-end WP

In December, CPT added to the current generation 8500 family of word processors—the 8505. Priced at \$6,990 for a single-floppy full-page stand-alone with 96K of memory and a 45 cps daisy wheel printer, the 8505 provides CPT's basic word processing. Options include a math package and the ability to run single-disk CP/M-compatible programs.

## New leaders for CCI

Computer Consoles, Inc., of Rochester has announced the appointment of Vaemon H. Crane as president and chief operating officer, and has elected former CCI president Herman A. Affel, Jr. to the position of chairman of the board and chief executive officer. Mr. Affel will serve as CCI's first Chairman.

Before coming to CCI, Crane served vice president and general manager of the Systems Group of Intel Corporation. Prior to joining Intel, he was with the Sperry Corporation for 20 years.

Just prior to these announcements, CCI announced contracts from two major telephone companies covering installation of fourteen Audio Response Systems, a system which reports digitized and stored telephone number messages, at existing CCI Directory Assistance System sites. These contracts are valued at over \$25 million and installations are expected to begin the second quarter of this year.



## Announcing: SEYBOLD SEMINARS '83

### Three Back-To-Back Seminars On Frontiers in Automated Publishing

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The purpose of these seminars is to gather the best talent from the U.S. and overseas for an *intense* and *highly focused* exploration of the key issues in areas which represent the cutting edge of pre-press technology for the graphic arts.

The sessions will provide an opportunity to discuss the latest developments in the field with the people responsible for directing the development activities, to learn about new systems and products soon to be offered to the market, and to exchange ideas with system manufacturers and sophisticated users.

Seminar #1:

Monday & Tuesday, March 7 & 8

#### Interactive Page Make-up

Interactive page make-up for newspapers, magazines, in-plant documentation, books and catalogs.

- ◆ How should page make-up be performed? How should it relate to the rest of the editorial and production process? What should you do about pictures and line art?
- ◆ First in-depth discussion of at least nine new systems. Numerous system announcements and product previews.

Seminar #2:

Wednesday & Thursday, March 9 & 10

#### Digital Graphics

Storage, manipulation and output of graphic information including line art, halftones, and computer-generated line graphics (CAD, automated illustration systems and business graphics).

- ◆ The economics of digitized graphics. Integrated text and graphics systems. What is the best approach for "image setters" which will output both text and graphics?
- ◆ First in-depth discussion of at least eight new systems.

Seminar #3:

Friday, March 11

#### Electronic Printers for Publishing

Direct-to-plain-paper output of "typeset" text and graphics.

- ◆ New equipment available.
- ◆ Use of electronic printers for proof output and for on-demand publishing.
- ◆ Forms composition. Graphics. Economics & trade-offs.

### Registration Information

**The hotel:** The Miramar-Sheraton Hotel is a modest-sized luxury hotel facing Palisades Park and the Pacific Ocean in Santa Monica, California. Virtually all rooms will be either ocean view rooms or suites (or both). Hotel accommodations will be \$84 per night, single room, and \$94 per night double room. We will send you a registration card when you register for the seminar.

**Fees:** \$385 for either of the two-day seminars; \$200 for the electronic printer seminar. \$100 discount for each additional seminar attended. \$485 for one two-day seminar plus the electronic printer seminar; \$670 for both two-day seminars; \$770 for all three seminars.

Registration fees include all seminar materials, luncheons and morning and afternoon breaks. Hotel accommodations and other meals are not included. We must receive your payment prior to the start of the seminar. Registrations may be cancelled without penalty through Feb. 18, 1983.

Information: Seybold Seminars; 28936 Cliffside Drive; Malibu, CA 90265 • (213) 457-7924



# Letters . . .



[Editor's note: These letters were submitted to our sister publication, *The Seybold Report on Office Systems*. We thought they were of significant enough general interest to warrant reproducing them here as well. We invite readers of *The Seybold Report on Professional Computing* to send us their comments for publication in future issues.]

## Ions: The debate continues. . .

I was very impressed with the amount of research effort it took to produce your *Seybold Report on Office Systems*, Vol. 5, No. 10] of October 1982 on VDT's. It may be useful to point out a couple of rough spots, and mention a new development in my "Miracle Cure" (tsk!) area discussed on pages 17-18.

Under "Noise" on page 10, it is unfortunately stated that "10 decibels doubles the sound we hear. . .," and this of course should read "3 decibels," making the real-world situation much worse than you depicted. And the units are conventionally written as dBA or dBa, rather than d BA, and never pluralized. However, you have probably had a few indignant squawks on that from the purists.

I was amused to note your backbreaking effort to avoid taking a position on my subject; you repeatedly misquote me as alleging and hedging a number of positive, provable statements I made and *documented* to your interviewer. I am sorry you view the problem of de-ionizing radiation as a contentious subject. It really is not; only the people who disagree with me are contentious (!). But, I do sympathize with the position of the industry which, by admitting to the validity of this effect might be opening themselves to some very unpleasant litigation—especially over the matter of affected pregnancies.

For this reason, in my lectures and publications, I try very hard to avoid placing the blame on the equipment, and to emphasize that it is actually an environmental problem falling within the purview of whoever is responsible for the ventilation.

There was one glaring misstatement in the last paragraph of "Miracle." The eye and skin irritation common to CRT operators are, in fact, *directly* attributable to de-ionizing radiation; they are *not* common to the usual list of symptoms caused by improper ion balances in other than a VDT environment.

To make a further case for ion effects, I invite your attention to the vague nature of the four most significant productivity complaints shown on your chart on page 5 of that issue. You see, most workers do not realize that their mood and efficiency are being impaired by poor ionic environments, and would not know an ion if it bit them in the aspiration. But they have got to think of something to justify obvious mood deficits and productivity decrements—in short, a lack of job satisfaction—and when they do not have a very specific and probably valid complaint (like the least significant items on your chart), they tend to blame the problem on vague circumstances such as, "my boss doesn't like me."

My colleagues and I have invariably observed an improvement in mood, job satisfaction, and certainly productivity as a result, in applying our techniques to poor ionic

working environments. The recipients of these benefits, however skeptical at the outset, could not have been aware of the cause of deficiencies until they had been made aware of the cure.

Now, the good news. In view of our successes in this area, some of the leading manufacturers of ion control equipment have begun designing simple, inexpensive, ceiling-suspended devices that can easily be wired right into the lighting circuits, and serve a cluster of working stations. No footprint. Also, some of these new systems lend themselves to more accurate control of the ambient ion balance by producing both positive and negative ions in appropriate ratios which can be manually adjusted to the environmental requirements.

This, I think, is the wave of the future.

Moreover, one of the very biggest national retailers is coming out with an inexpensive floor-mounted device next year. The rush is on!

I am enclosing a copy of what I consider to be an excellent interview. In fact, of the scores of such interviews I have given, this and a one-hour radio talk-show in Canada stand out in my mind as being the most cogent, carefully planned, and free from that old bugaboo, subjective observer bias.

I do wish you well, and am confident you will be on our side one of these days.

**Charles Wallach, Senior Research Scientist**  
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McLean, VA 22101

—To set the record straight, the author of the article, Hilde Uhler, was actually very convinced by Charles's arguments in favor of the ionization theory. However, by the time the article had run the gamut of our usual editorial process, she bowed to the general consensus that we knew too little first-hand about the subject to take as positive a stand as she felt was warranted. She has since bought an ionizer and will hopefully experience its benefits.

But to get some more opinions on the subject, we also contacted two government regulatory agencies to see what their views on the subject are.

The official position of the Food and Drug Administration, according to a spokesperson at the Philadelphia FDA office, is as follows:

"The FDA has seen no evidence that negative ion generators can fulfill the health claims for which they are promoted. No manufacturer has presented the agency with any evidence that the appliances are safe or effective."

At the National Institute of Occupational Safety and Health (NIOSH), we spoke to Dr. Michael Smith. He said that the experimental work concerning benefits of ion generators is suggestive but done without the proper experimental controls, and that therefore he considers the claims of benefit to be without scientific basis. NIOSH has reviewed the literature and has considered doing its own investigation, but has concluded that other factors in the workplace are much higher on the list of priorities for examination. Dr. Smith concludes that while the evidence is still not in as to possible ion-generator benefits, he would advise that people should emphasize the *known* ways of addressing office environment problems. They should not, in his judgment, look for easy technological solutions to the problems of the VDT working environment.

(More on page 32.)



# Letters (continued)

## Athena and Cadmus

At the beginning of your thorough review of Convergent Technologies' office systems, there is an apt reference to warriors who sprang up from dragon's teeth. They were the Spartoi, the "sown men," who fought amongst each other until only five survived. But they appear not in the legend of Jason, as your article suggests, but in the myth of Cadmus, founder of the city of Thebes and introducer of the alphabet and perhaps the art of metal casting to Greece.

The dragon that Cadmus killed was an offspring of Ares, god of war. But the sowing of its teeth was advised by Athena, goddess of arts & crafts (in particular weaving), civilization, wisdom and battle skills. One of her titles was Ergane, "work-woman." The surviving Spartoi helped Cadmus found Thebes, and this myth can perhaps be seen as a metaphor for the Athenian transformation of warlike powers to civilized pursuits. Athena's great craft of weaving had a verbal root (\*teks-) from which we receive

the terms text and textile (from Latin "textus," a weaving), and technology (from Greek "tekhne," art, craft, skill).

In the past 100 years technology has feminized the labor of text processing (see "The Mechanization of Women's Work" by Joan Wallach Scott, *Scientific American*, September 1982). The role of women in the electronic craft of weaving words into text was thus prefigured by the catalytic presence of Athena in the Cadmus myth. Although the Greeks understood the power of Athena, the same cannot be said for modern male engineers. As a case in point, the operating system of the Apollo workstation is called Ægis, which Apollo salesmen confidently proclaim to be the shield of Apollo. But the ægis, a goatskin bag inspiring fear in enemies, and fight, force, and pursuit in the wearer, actually belonged to Athena. Apollo merely borrowed it when he needed help. If the armies of women word-processors should some day rally round the gray-eyed goddess, and typographers become feminists, then we may see a further playing out of the Cadmean drama.

**Charles Bigelow, Assistant Professor**  
Department of Computer Science  
Stanford University  
Stanford, CA 94305

## About this Newsletter

**This is the first issue** of a new newsletter, and we would like to tell you a bit about what you can expect.

To begin with, we think that a tremendous change in the way we work is at hand. It is not merely an extension of computing technology, for the technology has reached a critical point; instead of doing the same tasks faster and cheaper, the nature of the tasks themselves is changing. The next generation of computing (of which the first example—Lisa—is covered in this issue) will be:

- **Visual.** Graphs, diagrams, plots are enormously more efficient than descriptive prose in communicating information.
- **Integrated and Comprehensive.** All the necessary functions—word processing, spread sheet, graphics, data base management, and communication—are routinely on line. Every software package can get its data from the output of any other program. All packages work the same way, using similar commands and having similar options.

- **Powerful.** Hard disk mass storage, sixteen-bit processor, network interface. No longer toys for grownups, but tools for serious people.

**In future issues** we will look at other examples of professional computing systems—or systems with the promise of becoming that. Look for writeups on Context MBA, the Lotus 1,2,3 package, and the various programs by VisiCorp which run under one VisiHost interface.

**What will the Seybold Report do for me?** We expect the new generation of computing equipment and software to be accompanied by a new generation of hype, exaggeration, and misinformation. Because our *Reports* are the result of extensive hands-on testing by our staff, backed by our years in evaluating office systems, you can confidently expect accurate in-depth analysis—the facts you need to know to make correct judgements. Because we are supported only by our subscribers (no advertising) we can be objective and fearless in our reporting.

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